19393

Class _____ No. _____

IN EXCHANGE

Digitized by the Internet Archive
in 2013

http://archive.org/details/transact12sout

TRANSACTIONS

OF THE

SOUTHERN SURGICAL AND GYNECOLOGICAL ASSOCIATION

VOLUME XII.

TWELFTH SESSION,

HELD AT NEW ORLEANS, LA.

DECEMBER 5, 6, AND 7, 1899.

AUG 6 - 1900

PUBLISHED BY THE ASSOCIATION.

1900.

DORNAN, PRINTER,
PHILADELPHIA.

OFFICERS FOR 1899-1900.

PRESIDENT.

A. M. CARTLEDGE, Louisville, Ky.

VICE-PRESIDENTS.

MANNING SIMONS, Charleston, S. C.
W. P. NICOLSON, Atlanta, Ga.

SECRETARY.

WILLIAM ELIAS B. DAVIS, Birmingham, Ala.

TREASURER.

W. D. HAGGARD, Jr., Nashville, Tenn.

COUNCIL.

GEORGE J. ENGELMANN, Boston, Mass.
ERNEST S. LEWIS, New Orleans, La.
GEORGE BEN JOHNSTON, Richmond, Va.
L. McLANE TIFFANY, Baltimore, Md.
LEWIS S. McMURTRY, Louisville, Ky.

19393

COMMITTEE OF PUBLICATION.

WILLIAM ELIAS B. DAVIS, Birmingham.
WILLIAM BODDIE ROGERS, Memphis.
VIRGIL ORVIN HARDON, Atlanta.

NOTE.

The Association does not hold itself responsible for the views enunciated in the papers and discussions published in this volume.

W. E. B. DAVIS, M.D., *Secretary*,
BIRMINGHAM, ALA.

CONTENTS.

PAGE

Officers iii
Honorary Members ix
Members xi
Constitution xxv
By-Laws xxvii
Minutes of the Twelfth Annual Meeting xxxi

Annual Address of the President. By JOSEPH TABER JOHNSON, M.D. 1
Ureterectomy. By J. WESLEY BOVÉE, M.D. 14
Myoma Originating in the Muscular Coat of the External Iliac Vein. By A. MORGAN CARTLEDGE, M.D. . . . 28
Treatment of Gunshot Wounds of the Abdomen, with Some New Statistics. By H. H. GRANT, M.D. 37
The History and Methods of Intralaryngeal Insufflation for the Relief of Acute Surgical Pneumothorax, with a Description of the Latest Devices for the Purpose. By RUDOLPH MATAS, M.D. 52
Rectovaginal Fistula: A Clinical Note. By LEWIS S. MCMURTRY, M.D. 85
A Case of Ossification of the Uterus. By C. JEFF MILLER, M.D. 92
The Surgery of Biliary Calculi. By WILLIAM D. HAGGARD, JR., M.D. 98
Inflammation of Meckel's Diverticulum, with Resulting Gangrene of the Intestine Simulating Appendicitis. By WILLIAM PERRIN NICOLSON, M.D. 121
Two Cases of Intraligamentous Cysts. By T. J. CROFFORD, M.D. 129
Experience in Operations for Typhoid Perforations. By HUGH M. TAYLOR, M.D. 137
Some Interesting Cases of Abdominal Surgery. (*a*) Pancreatic Cyst; (*b*) Hepatic Calculi; (*c*) Fecal Fistulæ; (*d*) Combined Appendectomy and Nephrorrhaphy. By FLOYD WILLCOX MCRAE, M.D. 154

PAGE
Litholapaxy. By GEORGE S. BROWN, M.D. 169
Treatment of Retrodisplacement of the Uterus. By I. L. WATKINS, M.D. 180
Report of Cases of Spinal Injury Treated at the Charity Hospital, New Orleans, During 1899. By E. D. FENNER, M.D. . 190
Peritonitis, with Perforation of Small Intestine. Gunshot Wound of the Abdomen, with Thirteen Perforations. By T. J. CROFFORD, M.D. 200
Seventeen Years of Congenital Nocturnal Incontinence of Urine Cured by Operation. By GEORGE H. NOBLE, M.D. 210
Suspension of the Uterus by Intramural Shortening of the Round Ligaments. By GEORGE H. NOBLE, M.D. . . 212
An Operation for Cystocele. By GEORGE H. NOBLE, M.D. . 223
The Immediate Hermetic Sealing of Septic Wounds. Is it Safe? Is it Advised? By HENRY O. MARCY, M.D. . 235
Beef-gall enemata in the Treatment of Post-operative Obstinate Constipation and Intestinal Obstruction. By F. C. AMEISS, M.D. 244
The Different Phases of Electric Treatment. By J. MCFADDEN GASTON, M.D. 251
Report of a Unique Case of Appendicitis, with Some Remarks on Treatment. By JAMES T. JELKS, M.D. . . . 261
Bilharzia Hæmatobia. By EDWIN WALKER, M.D. . . . 270
The Technique of Early Operation for Cleft Palate. By JAMES E. THOMPSON, M.B., B.S. (Lond.), F.R.C.S. (Eng.) . . 279
Simple Fracture of the Patella, with Some Suggestions as to Treatment. By E. DENEGRE MARTIN, M.D. . . . 292
Prophylaxis of Surgical Shock. By W. M. PERKINS, M.D. . 298
Surgical Anæsthesia. By R. S. CATHCART, M.D. . . . 307
Retrodislocation of the Uterus. By R. S. HILL, M.D. . . 313
Vesical Calculi in Children: Report of Four Cases Under Five Years of Age. By FRANK D. SMYTHE, M.D. . . . 322
Excision of the Shoulder-joint. By A. R. SHANDS, M.D. . 329
Jacksonian Epilepsy Due to Unrelieved Depressed Fracture of the Skull. Report of Two Cases. By L. BURTHE, M.D. . 334
Two Cases of Œsophageal Diverticulum, with Remarks. By MAURICE H. RICHARDSON, M.D. 338
The Exploration of the Abdomen as an Adjunct to every Cœliotomy. By HOWARD A. KELLY, M.D. 355
One Hundred and Twelve Cases of Pregnancy in Uterus Bicornis. By GEORGE H. NOBLE, M.D. 365
Tumors of the Masseter, with Special Reference to Sarcoma. By FELIX A. LARUE, M.D. 390

HONORARY MEMBERS.

1894.—Foy, George,	Dublin.
1894.—Jacobs, Charles,	Brussels.
1894.—Martin, A.,	Berlin.
1894.—Morisani, O.,	Naples.
1894.—Pozzi, S.,	Paris.

MEMBERS.

1897.—Ameiss, F. C., M.D. Clinical Professor of Gynecology, Missouri Medical College. St. Louis, Mo.

1894.—Baldridge, F. E., M.D. Huntsville, Ala.

1890.—Baxter, George A., M.D. Professor of Surgery in the Medical Department of Grant University; ex-President of the Tennessee State Medical Association; Fellow of the American Surgical Association. *Vice-President*, 1893. Chattanooga, Tenn.

1893.—Bloom, J. D., M.D. Surgeon-in-Charge, Charity Hospital; Consulting Surgeon, Touro Infirmary; Lecturer on Diseases of Children, Tulane University. New Orleans, La.

1890.—Bosher, Lewis Crenshaw, M.D. Professor of Surgery in the Medical College of Virginia; Visiting Surgeon to the Old Dominion Hospital; Member of the American Association of Obstetricians and Gynecologists, and Association of American Anatomists. Richmond, Va.

1895.—Bovée, J. W., M.D. Gynecologist to Columbia and Providence Hospitals; Clinical Professor, Medical Department of Columbian University; Fellow of American Gynecological Society; Honorary Member, Virginia Medical Society; Member of Washington Obstetrical Society, the American Medical Association, and the Medical and Surgical Society, District of Columbia. Washington, D.C.

1889.—Brokaw, Augustus V. L., M.D. Professor of Anatomy in the Missouri Medical College; Assistant to the Chair of Surgery and Senior Assistant Surgeon, St. John's Hospital. St. Louis, Mo.

1898.—Brown, George S., M.D. Ex-President Jefferson County Medical Society. Birmingham, Ala.

1897.—Bryson, John P., M.D. Professor of Genito-urinary Surgery, St. Louis Medical College; Surgeon to the St. Louis Mullanphy Hospital. St. Louis, Mo.

1895.—Buckmaster, A. H., M.D. Professor of Gynecology and Obstetrics, University of Virginia. Charlottesville, Va.

1899.—Burthe, L., M.D. New Orleans, La.

1891.—Cartledge, Abiah Morgan, M.D. Professor of Gynecology and Abdominal Surgery, Louisville Medical College; Visiting Surgeon to the Louisville City Hospital; Surgeon to the Louisville Home of the Friendless; ex-President of the Louisville Medico-Chirurgical Hospital. *Treasurer*, 1895–1899; *President*, 1900. Louisville, Ky.

1899.—Cathcart, R. S., M.D. Assistant to Chair of Clinical Surgery in the Medical College of the State of South Carolina. Charleston, S. C.

1894.—Charlton, Thomas, M.D. Savannah, Ga.

1896.—Christian, W. G., M.D. Professor of Anatomy, University of Virginia. Charlottesville, Va.

1893.—Cocram, Henry S., M.D. New Orleans, La.

1893.—Coley, Andrew Jackson, M.D. Councillor of the Medical Association of the State of Alabama. Alexander City, Ala.

Founder.—Copeland, Benjamin G., M.D. Professor of Anatomy and Clinical Surgery, Birmingham Medical College; Professor of Anatomy and Surgery, Birmingham Dental College; Surgeon and Gynecologist, Hillman Hospital. Birmingham, Ala.

1893.—Crofford, T. J., M.D. Professor of Physiology and Clinical Lecturer on Gynecology in the Memphis Hospital Medical College. Memphis, Tenn.

1893.—Crow, Walter A., B.S., M.D. Professor of Obstetrics and Diseases of Children, Southern Medical College; ex-President Atlanta Obstetrical Society. Atlanta, Ga.

Founder.—Cunningham, Russell M., M.D. Professor of Practice of Medicine and Clinical Medicine, Birmingham Medical College; Surgeon to the Pratt Mines Hospital. Ensley, Ala.

1894.—Dandridge, Nathaniel Pendleton, M.D. Professor of Surgery, Miami Medical College; Surgeon to Cincinnati Hospital and Episcopal Hospital for Children. Cincinnati, O.

Founder.—Davis, John D. S., M.D. Professor of Principles and Practice of Surgery and Clinical Surgery, Birmingham Medical College; formerly Gynecologist to Birmingham Hospital of United Charities; formerly Chairman of the Judicial

Council of the Alabama Surgical and Gynecological Association; ex-President of the Jefferson County Medical Society and of the Board of Health. Birmingham, Ala.

Founder.—Davis, William Elias B., M.D. Professor of Gynecology and Abdominal Surgery, Birmingham Medical College; ex-President of the Tri-State Medical Society of Alabama, Georgia, and Tennessee; Fellow of the American Association of Obstetricians and Gynecologists, and First Vice-President, 1895; formerly Chairman of the Section of Obstetrics and Diseases of Women, and Vice-President of the American Medical Association; Honorary Member of the Medical Society of the State of New York and of the Louisiana State Medical Association; Honorary President of Section on Abdominal Surgery, Pan-American Medical Congress, 1893, and Vice-President of Congress of 1896; Fellow of the British Gynecological Society; formerly Surgeon to the Birmingham Hospital of United Charities. *Secretary*, 1887–1902. Birmingham, Ala.

1891.—Dean, G. R., M.D. Fellow of the American Association of Obstetricians and Gynecologists. Spartanburg, S. C.

1892.—Dixon, Archibald, M.D. Ex-President of the Kentucky State Medical Society; ex-President of the McDowell Medical Society; ex-President of the Mississippi Valley Medical Association. Henderson, Ky.

1897.—Dorset, Walter B., M.D. Professor of Obstetrics and Clinical Gynecology, Beaumont Hospital Medical College; Gynecologist to Missouri Baptist Sanitarium; Gynecologist to Evangelical Deaconess' Hospital. St. Louis, Mo.

1896.—Doughty, W. H., M.D. Professor of Anatomy and Clinical Surgery, Medical Department, University of Georgia. Augusta, Ga.

Founder.—Douglas, Richard, M.D. Ex-President of the Tri-State Medical Society of Alabama, Georgia, and Tennessee; Fellow of the American Association of Obstetricians and Gynecologists; Fellow of the British Gynecological Association; Professor of Gynecology, Medical Department of Vanderbilt University. *Treasurer*, 1894–1895; *Vice-President*, 1896; *President*, 1898. Nashville, Tenn.

1889.—Earnest, J. G., M.D. Professor of Gynecology in the Southern Medical College, and Gynecologist to Grady Hospital. Atlanta, Ga.

1891.—Elkin, William Simpson, M.D. Professor of Genito-urinary Diseases and Clinical Surgery in the Southern Medical College; ex-President of the Atlanta Society of Medicine. Atlanta, Ga.

1889.—Engelmann, George J., M.D. Master in Obstetrics, Vienna; late Professor of Obstetrics and Diseases of Women, St. Louis Post-Graduate School; formerly Professor of Diseases of Women and Operative Midwifery, Missouri Medical College; President of the American Gynecological Society. *President*, 1890; *Council*, 1890–1900. Boston, Mass.

1896.—Eve, Paul F., M.D. Professor of Surgery, Medical Department, University of Tennessee. Nashville, Tenn.

1894.—Fenger, Christian, M.D. Professor of Clinical Surgery, Northwestern University Medical School, Chicago; Professor of Surgery, Chicago Polyclinic; Surgeon to Cook County Hospital. Chicago, Ill.

1898.—Fenner, E. D., M.D. New Orleans, La.

1895.—Fortier, S. M., M.D. Visiting Surgeon to Charity Hospital. New Orleans, La.

1895.—Fry, Henry D., M.D. Professor of Obstetrics Georgetown University. Washington, D. C.

1890.—Gaston, James McFadden, M.D. Formerly Professor of Principles and Practice of Surgery in the Southern Medical College; Surgeon to Providence Infirmary; ex-Chairman of Surgical Section of the American Medical Association; Fellow of American Surgical Association; ex-President of American Academy of Medicine. *Vice-President*, 1891; *President*, 1892. Atlanta, Ga.

1898.—Gessner, Hermann, M.D. New Orleans, La.

1897.—Glasgow, Frank A., M.D. Professor of Clinical Gynecology of St. Louis Medical College; Gynecologist to St. Louis Mullanphy Hospital; on Staff of Mission Baptist Sanitarium and of Martha Parsons Free Hospital; Consulting Surgeon to St. Louis Female Hospital. St. Louis, Mo.

Founder.—Goggans, James A., M.D. Ex-President of the Tri-State Medical Society of Alabama, Georgia, and Tennessee; Senior Councillor of the Medical Association of the State of Alabama; Fellow of the British Gynecological Society. *Vice-President*, 1888. Alexander City, Ala.

Founder.—Graham, Joseph, M.D. Ex-Member of North

Carolina State Board of Health; ex-Member of North Carolina State Board of Medical Examiners; ex-President of the State Medical Society of North Carolina. Charlotte, N. C.

1892.—Grant, Horace H., M.D. Professor of Surgery in the Hospital College of Medicine; Surgeon to the Louisville City Hospital. Louisville, Ky.

1896.—Gwathmey, Lomax, M.D. Attending Gynecologist to St. Vincent Hospital and Dispensary. Norfolk, Va.

Founder.—Hadra, Berthold Ernest, M.D. Formerly Professor of Surgery, Texas Medical College and Hospital; ex-President of the West Texas Medical Association. *Vice-President*, 1890. San Antonio, Texas.

Founder.—Haggard, William David, M.D. Professor of Gynecology and Diseases of Children, Medical Department of the University of Tennessee; President of the Nashville Obstetrical and Gynecological Society. *President*, 1888; *Member of Council*, 1892–1897. Nashville, Tenn.

1896.—Haggard, W. D., Jr., M.D. Professor of Gynecology and Abdominal Surgery, University of the South (Sewanee); Associate Professor of Gynecology, Medical Department, University of Tennessee; Gynecologist to the Nashville City Hospital; Member of the Alumni Association of the Woman's Hospital of New York. *Treasurer*, 1900–1902. Nashville, Tenn.

1892.—Hall, Rufus Bartlett, A.M., M.D. Professor of Clinical Gynecology in the Miami Medical College; Gynecologist to the Presbyterian Hospital; ex-President of the Cincinnati Obstetrical Society; President of the American Association of Obstetricians and Gynecologists; Fellow of the British Gynecological Society; Member of the American Medical Association and of the Ohio State Medical Society. Cincinnati, O.

Founder.—Hardon, Virgil Orvin, M.D. Professor of Obstetrics and Diseases of Women and Children, Atlanta Medical College; Consulting Physician to the King's Daughters' Hospital. Fellow of the American Gynecological Society. *Member of Council*, 1888–1893. Atlanta, Ga.

1896.—Heflin, Wyatt, M.D. President of the Jefferson County Medical Society. Birmingham, Ala.

Founder.—Herff, Ferdinand, M.D. San Antonio, Texas.

1899.—Hill, R. S., M.D. Montgomery, Ala.

Founder.—Hogan, S. M., M.D. Grand Senior Councillor and

ex-Vice-President of the Medical Association of the State of Alabama. Montgomery, Ala.

1891.—Holmes, J. B. S., M.D. Ex-President of the Tri-State Medical Society of Alabama, Georgia, and Tennessee; ex-President of the Georgia Medical Association; Fellow of the American Association of Obstetricians and Gynecologists. Atlanta, Ga.

1896.—Hundley, J. Mason, M.D. Associate Professor of Diseases of Women and Children, University of Maryland; President Clinical Society of Baltimore. Baltimore, Md.

1892.—Hunter, H. M., M.D. Union Springs, Ala.

1888.—Jelks, James Thomas, M.D. Formerly Professor of Diseases of the Genito-urinary Organs in the College of Physicians and Surgeons, Chicago; ex-Chairman of the Surgical Section of the American Medical Association. Hot Springs, Ark.

1889.—Johnson, Joseph Taber, M.D. Professor of Gynecology in the Medical Department of the Georgetown University; Gynecologist to the Providence Hospital; ex-President of the American Gynecological Society; Fellow of the British Gynecological and British Medical Associations; President of the Washington Obstetrical and Gynecological Society. *Vice-President*, 1896; *President*, 1899. Washington, D. C.

Founder.—Johnston, George Ben, M.D. Formerly Consulting Surgeon to the Richmond Eye, Ear, and Throat Infirmary; ex-President of the Richmond Academy of Medicine and Surgery; ex-President of the Medical Society of Virginia; Member of the American Medical Association; Member of the American Association of Obstetricians and Gynecologists, and First Vice-President, 1896; Member of the Ninth International Medical Congress; Member of the American Surgical Association; late Professor of Anatomy in the Medical College of Virginia, and now Professor of the Practice of Surgery and Clinical Surgery; Surgeon to the Old Dominion Hospital; Honorary Member of the State Veterinary Medical Association; Consulting Surgeon to the City Free Dispensary. *Vice President*, 1892; *President*, 1897. Richmond, Va.

1890.—Kelly, Howard Atwood, M.D. Professor of Gynecology in the Johns Hopkins University; Gynecologist and Obstetrician to the Johns Hopkins Hospital of Baltimore; Founder of and Consulting Surgeon to the Kensington Hospital

of Philadelphia; ex-President of the Protestant Episcopal Hospital of Philadelphia; Fellow of the Americal Gynecological Society. Baltimore, Md.

1895.—Kime, Rufus R., M.D. Ex-President Atlanta Society of Medicine; ex-President of Atlanta Obstetrical Society; President of the Tri-State Medical Society of Alabama, Georgia, and Tennessee. Atlanta, Ga.

1899.—Kohlman, William, M.D. New Orleans, La.

1897.—Laidley, L. H., M.D. Surgeon to the Protestant Hospital; Professor of Gynecology and Pelvic Surgery, Beaumont Hospital Medical College; Member of the American Association of Obstetricians and Gynecologists; Member of the American Medical Association. St. Louis, Mo.

1899.—Larue, F. A., M.D. Chief of Clinic to the Chair of Surgery, Tulane University of Louisiana; Lecturer on Operative Surgery, New Orleans Polyclinic; Visiting Surgeon to Charity Hospital. New Orleans, La.

1889.—Le Grand, John C., M.D. Ex-Vice-President of the American Medical Association; President of the Medical Association of the State of Alabama. Birmingham, Ala.

1894.—Leigh, Southgate, M.D. Attending Surgeon to St. Vincent's Hospital. Norfolk, Va.

1893. Lewis, Ernest S., M.D. Professor of Gynecology, Medical Department of the Tulane University. *Vice-President*, 1894; *President*, 1896; *Member of Council*, 1896–1901. New Orleans, La.

1893.—Lewis, Hampton S., M.D. New Orleans, La.

1899.—Loeber, F., M.D. New Orleans, La.

Founder.—Long, John W., M.D. Emeritus Professor of Gynecology and Pediatrics in the Medical College of Virginia; formerly Gynecologist to the Old Dominion Hospital and the Richmond City Dispensary; Fellow of the Richmond Academy of Medicine and Surgery; Honorary Member of the Alumni Association of the Medical College of Virginia; Member of the State Medical Society of Virginia; Consulting Surgeon to the Watts Hospital, Durham; Member, ex-Orator, and ex-Vice-President of the North Carolina Medical Society; Honorary Member of the Randolph County Medical Society; Member of the Rowan County Medical Society. Salisbury, N. C.

1895.—McGannon, M. C., M.D. Professor of Gynecology, Medical Department, University of Nashville. Nashville, Tenn.

Founder.—McGuire, Hunter Holmes, M.D., LL.D. Ex-President of the Virginia Medical Society; ex-President of the American Surgical Association; ex-President of the Association of Medical Officers of the Army and Navy, Confederate States; ex-Vice-President of the International Medical Congress; ex-Vice President and ex-President of the American Medical Association. *Member of Council*, 1887–1888, 1889–1891, 1891–1896; *President*, 1889. Richmond, Va.

1893.—McGuire, Stuart, M.D. Professor of Principles of Surgery in the University College of Medicine; Surgeon to St. Luke's Home for the Sick and to the Virginia Hospital. Richmond, Va.

1891.—McGuire, William Edward, M.D. Richmond, Va.

1888.—McMurtry, Lewis S., M.D. Ex-President of the American Association of Obstetricians and Gynecologists; Fellow of the Edinburgh Obstetrical Society; ex-President of the Kentucky State Medical Society; Corresponding Member of the Obstetrical Society of Philadelphia; Corresponding Member of the Gynecological Society of Boston; Honorary Fellow of the Medical Society of the State of New York. *President*, 1891; *Member of Council*, 1892–1904. Louisville, Ky.

1888.—McRae, Floyd Willcox, M.D. Formerly Demonstrator of Anatomy and Lecturer on Venereal Diseases, Atlanta Medical College; Professor of Physiology and Clinical Surgery in the Southern Medical College. *Vice-President*, 1897. Atlanta, Ga.

1891.—Marcy, Henry Orlando, M.D., LL.D. Ex-President of the American Medical Association; President of the Section of Gynecology, Ninth International Medical Congress; late President of the American Academy of Medicine; Corresponding Member of the Medico-Chirurgical Society of Bologna, Italy; Fellow of the American Association of Obstetricians and Gynecologists. 336–338 Boylston Street, Boston, Mass.

1899.—Martin, Edmund D., M.D. Professor of Minor and Clinical Surgery, New Orleans Polyclinic; Visiting Surgeon to the Charity Hospital. New Orleans, La.

1899.—Mastin, William, M.D. Fellow of the American Surgical Association. Mobile, Ala.

1893.—MATAS, R., M.D. Professor of Surgery, Medical Department of Tulane University; Fellow of the American Surgical Association. New Orleans, La.

1897.—MATHEWS, J. M., M.D. Professor of the Principles and Practice of Surgery and Diseases of the Rectum, Kentucky School of Medicine; Consulting Surgeon to the Louisville City Hospital and to Sts. Mary and Elizabeth Hospital; ex-President of the Mississippi Valley Medical Association; ex-President of the American Medical Association. Louisville, Ky.

1896.—MATTHEWS, WILLIAM P., M.D. Professor of Anatomy, Medical College of Virginia; Orthopedic Surgeon to the Old Dominion Hospital. Richmond, Va.

1888.—MAURY, RICHARD BROOKS, M.D. Professor of Gynecology, Memphis Hospital Medical College; Fellow of the American Gynecological Society; Fellow of the British Gynecological Society. Memphis, Tenn.

Founder.—MERIWETHER, FRANK T., M.D. Assistant Surgeon, U. S. A. Retired. Asheville, N. C.

1899.—MICHINARD, P. E., M.D. New Orleans, La.

1898.—MILLER, C. JEFF., M.D. Visiting Gynecologist to the Charity Hospital, New Orleans; Chief of Clinic to Chair of Gynecology and Obstetrics, Tulane University of Louisiana; Lecturer on Clinical and Minor Gynecology at the New Orleans Polyclinic. New Orleans, La.

1899.—MILLIKEN, SAMUEL E., M.D. Dallas, Texas.

1891.—MURFREE, JAMES BRICKLE, M.D. Ex-President of the Tennessee State Medical Society; ex-President of the Tri-State Medical Society of Alabama, Georgia, and Tennessee; President of the State Board of Medical Examiners of Tennessee. Murfreesboro, Tenn.

1894.—MURPHY, J. B., M.D. Professor of Surgery, College of Physicians and Surgeons; Attending Surgeon to Cook County and Alexian Brothers' Hospital; Professor of Surgery, Post-Graduate Medical School; Consulting Surgeon at the Hospital for Crippled Children. Chicago, Ill.

1896.—MYERS, WILLIAM H., M.D. Surgeon to St. Joseph's Hospital; Fellow of the American Association of Obstetricians and Gynecologists; Member of the American and British Medical Associations; Member of the Pathological Society of London; Member of the International Congress of Gynecologists and

Obstetricians; Member of the Chicago Medical Society. Fort Wayne, Ind.

Founder.—NASH, HERBERT MILTON, M.D. Consulting Surgeon to the Retreat for the Sick (Hospital), Norfolk; Visiting Surgeon of the Hospital St. Vincent de Paul; ex-President of the Norfolk City Medical Society; Member of the State Board of Medical Examiners of Virginia. Norfolk, Va.

1899.—NEFF, WALLACE, M.D. Formerly Adjunct Professor of Clinical Surgery and Surgical Pathology, Medical College of Ohio (University of Cincinnati); Surgeon to Emergency Hospital. Washington, D. C.

1891.—NELSON, H. T., M.D. Member of the Medical Examining Board of Virginia. Charlottesville, Va.

1889.—NICOLSON, WILLIAM PERRIN, M.D. Professor of Anatomy and Clinical Surgery, College of Physicians and Surgeons. Atlanta, Ga.

1896.—NOBLE, CHARLES P., M.D. Surgeon-in-Chief, Kensington Hospital for Women; Consulting Surgeon, Woman's Hospital; Lecturer on Gynecology, Philadelphia Polyclinic. Philadelphia, Pa.

1890.—NOBLE, GEORGE H., M.D. Ex-President of the Georgia Medical Association; ex-Secretary of Obstetrical Section of the American Medical Association. Atlanta, Ga.

1890.—NUNN, R. J., M.D. Savannah, Ga.

Founder.—PAINE, JOHN FANNIN YOUNG, M.D. Dean and Professor of Obstetrics and Diseases of Women and Children in the Texas Medical College and Hospital; Fellow of the American Association of Obstetricians and Gynecologists; ex-President of the Texas Medical Association. Galveston, Texas.

1888.—PARHAM, F. W., M.D. Professor in the New Orleans Polyclinic. New Orleans, La.

1893.—PARISH, W. H., M.D. Gynecologist to St. Agnes' Hospital; Consulting Surgeon, Kensington Hospital; Consulting Obstetrician, Lying-in-Charity; Professor of Anatomy, Woman's Medical College of Pennsylvania; Professor of Obstetrics, Dartmouth Medical College. Philadelphia, Pa.

1893.—PARKER, WILLIAM E., M.D. Visiting Surgeon to the Charity Hospital. *Vice-President*, 1897. New Orleans, La.

1899.—PERKINS, W. M., M.D. Chief of Clinic Chair of General Clinical and Operative Surgery, New Orleans Poly-

clinic; Assistant Demonstrator of Operative Surgery, Medical Department, Tulane University of Louisiana; Visiting Surgeon to the Charity Hospital. New Orleans, La.

1898.—Platt, Walter Brewster, M.D. Surgeon to the Robert Garrett Hospital for Children. Baltimore, Md.

1889.—Polk, William M., M.D. Professor of Obstetrics and Diseases of Women and Children, University of the City of New York; Physician to Bellevue Hospital and to the Emergency Lying-in Hospital; Consulting Gynecologist to St. Luke's Hospital; Fellow of the American Gynecological Society. New York, N. Y.

1889.—Potter, William Warren, M.D. Consulting Gynecologist to the Maternity Hospital; Chairman of the Section of Obstetrics and Diseases of Women, American Medical Association, 1890; ex-President of the Buffalo Medical Society; ex-President of the Medical Society of the State of New York; Secretary of the American Association of Obstetricians and Gynecologists; Chairman of the Section of Abdominal Surgery, Pan-American Medical Congress, 1893. Buffalo, N. Y.

1894.—Powell, Seneca D., M.D. Professor of Surgery in the New York Post-Graduate Medical School and Hospital; Visiting Surgeon to St. Mark's Hospital, New York. 12 West 40th Street, New York, N. Y.

1889.—Price, Joseph, M.D. Physician-in-charge of the Obstetrical and Gynecological Department of the Philadelphia Dispensary; Fellow of the American Association of Obstetricians and Gynecologists; ex-Chairman Section of Diseases of Women and Obstetrics, American Medical Association. *Vice-President*, 1893. Philadelphia, Pa.

1890.—Reamy, Thaddeus Asbury, M.D., LL.D. Professor of Clinical Gynecology in the Medical College of Ohio; Obstetrician and Gynecologist to the Cincinnati Hospital; Gynecologist to the Good Samaritan Hospital; Surgeon to the Cincinnati Woman's Hospital; Consulting Gynecologist to Christ's Hospital; Consulting Gynecologist to the Ohio State Woman's Hospital; ex-President of the American Gynecological Society; ex-President of the Ohio State Medical Society; ex-President of the Cincinnati Obstetrical Society and Academy of Medicine; Corresponding Member of the Boston Gynecological Society and of the Detroit Academy of Medicine. Cincinnati, O.

1890.—Reed, Charles Alfred Lee, M.D. Professor of

Gynecology and Abdominal Surgery in the Cincinnati College of Medicine and Surgery; Surgeon to the Cincinnati Free Hospital for Women; Fellow of the American Association of Obstetricians and Gynecologists; Fellow of the British Gynecological Society; ex-Chairman of the Section on Obstetrics and Diseases of Women of the American Medical Association; Secretary-General of the Pan-American Medical Congress, 1893; Honorary Member of the Medical Society of the State of New York. Cincinnati, O.

1894.—RHETT, R. B., M.D. Dean and Professor of Surgery, Charleston Medical College; Surgeon to City Hospital. Charleston, S. C.

1899.—RICHARDSON, MAURICE HOWE, M.D. Visiting Surgeon to the Massachusetts General Hospital; Assistant Professor of Clinical Surgery, Harvard Medical School. Boston, Mass.

1888.—ROBERTS, WILLIAM O., M.D. Professor of Operative Surgery and Surgical Pathology, Medical Department of the University of Louisville; formerly Secretary of the Surgical Section of the American Medical Association. *Vice-President*, 1889. Louisville, Ky.

1889.—ROBINSON, WILLIAM LOVAILLE, M.D. Fellow of the American Association of Obstetricians and Gynecologists; ex-President of the Danville Medical Society; Member of the Medical Examining Board of Virginia; ex-President of Virginia Medical Society. Danville, Va.

1892.—RODMAN, WILLIAM L., M.D. Professor of the Principles of Surgery and Clinical Surgery in the Medico-Chirurgical College. Philadelphia, Pa.

Founder.—ROGERS, WILLIAM BODDIE, M.D. Professor of the Practice of Surgery and Clinical Surgery, Memphis Hospital Medical College; ex-Vice-President of the American Medical Association and National Association of Railway Surgeons. Memphis, Tenn.

1899.—ROYSTER, HUBERT A., M.D. One of the Visiting Staff of Rex Hospital; Surgeon-in-Charge of St. Agnes' Hospital. Raleigh, N. C.

1893.—SAUNDERS, BACON, M.D. Fort Worth, Texas.

Founder.—SCHILLING, NICHOLAS, M.D. Cedar Bayou, Texas.

1893.—SENN, NICHOLAS, M.D., Ph.D., LL.D. Professor of Practice of Surgery and Clinical Surgery, Rush Medical College; Professor of the Practice of Surgery, Chicago Polyclinic; Attending Surgeon, Presbyterian Hospital; Surgeon to St. Joseph's

Hospital; ex-President of the American Surgical Association. Chicago, Ill.

1899.—SHANDS, A. R., M.D. Professor of Orthopædic Surgery, Columbian University. Washington, D. C.

Founder.—SHIVERS, OFFA LUNDSFORD, M.D. Councillor of the Alabama Medical Association. Marion, Ala.

1892.—SIMONS, T. GRANGE, M.D. Ex-President of the South Carolina Medical Association; Member of the State Board of Health of South Carolina; formerly President of the Charleston County Medical Society. Charleston, S. C.

1893.—SIMONS, MANNING, M.D. Professor of Clinical Surgery in the Medical College of the State of South Carolina; Surgeon to St. Francis' Infirmary; Surgeon to City Hospital. *Vice-President*, 1895 and 1900. Charleston, S. C.

1894.—SMITH, REGINALD K., M.D. United States Navy.

1899.—SMYTHE, FRANK DAVIE, M.D. Surgeon to the City Hospital; Gynecologist to St. Joseph's Hospital; Assistant Professor of Surgery, Memphis Hospital Medical College; Demonstrator of Operative Surgery; formerly Member of the State Board of Examiners of Mississippi. Memphis, Tenn.

Founder.—SOUCHON, EDMOND, M.D. Professor of Anatomy and Clinical Surgery, Medical Department of the Tulane University; Member of the American Surgical Association. New Orleans, La.

Founder.—STONE, ISAAC SCOTT, M.D. Gynecologist to the Columbia Hospital; Fellow of the American Association of Obstetricians and Gynecologists; Fellow of the British Gynecological Society; formerly Member of the Medical Examining Board of Virginia. Washington, D. C.

1894.—TALLEY, D. F., M.D. Ex-President Jefferson County Medical Society; Professor of Materia Medica and Lecturer on Surgery, Birmingham Medical College. Birmingham, Ala.

Founder.—TAYLOR, B. W., M.D. Ex-President of the State Medical Association of South Carolina; ex-President of the Columbia Medical Society. Columbia, S. C.

Founder.—TAYLOR, HUGH M., M.D. Professor of Practice of Surgery, University College of Medicine; Surgeon to the Virginia Hospital; ex-President of the Virginia Board of Medical Examiners. Richmond, Va.

1898.—TAYLOR, WILLIAM WOOD, A.B., M.D. Gynecologist

to St. Joseph's and the Memphis City Hospitals. 343 Adams Street, Memphis, Tenn.

1892.—THOMPSON, J. E., M.D. Professor of Surgery in the University of Texas. Galveston, Texas.

1891.—TIFFANY, LOUIS MCLANE, M.D. Professor of Surgery in the University of Maryland; Fellow of the American Surgical Association. *President*, 1895. Baltimore, Md.

1890.—TOMPKINS, CHRISTOPHER, M.D. Professor of Obstetrics in the Medical College of Virginia. Richmond, Va.

1891.—TRIPPE, RICHARD JEFFERSON, M.D. Ex-President of the Chattanooga Medical Society. Chattanooga, Tenn.

1888.—TUHOLSKE, HERMAN, M.D. Professor of Surgery in the Missouri Medical College. St. Louis, Mo.

1893.—VANDER VEER, ALBERT, M.D. Professor of Clinical, Didactic, and Abdominal Surgery, Albany Medical College; Fellow of the American Surgical Association; ex-President of the American Association of Obstetricians and Gynecologists. Albany, N. Y.

1891.—WALKER, EDWIN, M.D., Ph.D. Gynecologist to the Evansville City Hospital; ex-President of the Indiana State Medical Society; Fellow of the American Association of Obstetricians and Gynecologists. Evansville, Ind.

1898.—WATKINS, ISAAC LAFAYETTE, M.D. President of the Montgomery County Medical and Surgical Society. Montgomery, Ala.

1888.—WESTMORELAND, WILLIS F., M.D. Professor of Surgery, Atlanta Medical College. Atlanta, Ga.

1897.—WILLIAMS, R. F., M.D. Professor of Materia Medica and Therapeutics and Lecturer on Orthopedic Surgery, Medical College of Virginia; Orthopedist to the Old Dominion Hospital and City Free Dispensary. Richmond, Va.

Founder.—WILSON, J. T., M.D. Ex-President of the North Texas Medical Association; President of the Texas Medical Association; Superintendent of the State Hospital for the Insane. *Vice-President*, 1891. Terrell, Texas.

1891.—WYETH, JOHN ALLEN, M.D. Professor of Surgery in the New York Polyclinic; Consulting Surgeon to St. Elizabeth's Hospital; Visiting Surgeon to Mt. Sinai Hospital and Polyclinic Hospital; Honorary Member of the Texas State Medical Association; ex-President of the New York Pathological Society, New York, N. Y.

CONSTITUTION.

ARTICLE I.

The name of this Association shall be The Southern Surgical and Gynecological Association.

ARTICLE II.

The object of this Association is to further the study and practice of surgery and gynecology among the profession of the Southern States.

ARTICLE III.

This Association shall adopt and conform to the Code of Ethics of the American Medical Association.

ARTICLE IV.

Section 1. Any reputable physician who practises surgery or gynecology, and who is vouched for by two members of the Association and recommended by the Council, shall be eligible to membership in this body.

Sec. 2. The honorary members shall not exceed ten in number, and shall enjoy all the privileges of other members, excepting to vote or hold office, but shall not be required to pay any fee.

ARTICLE V.

Section 1. The officers of this Association shall be a President, two Vice-Presidents, a Secretary, a Treasurer, and a Council, elected by ballot, without nomination.

Sec. 2. The President and Vice-Presidents shall be elected for one year, and the President shall not be eligible for re-election at any time; the Secretary and Treasurer, each, for five years; and the Council as provided for in the By-laws.

ARTICLE VI.

SECTION 1. It shall be the duty of the President to preside at all meetings of the Association ; to give the casting vote ; to see that the rules of order and decorum be properly enforced in all deliberations of the Association ; to sign the approved proceedings of each meeting, and to approve such orders as may be drawn upon the Treasurer for expenditures ordered by the Association.

SEC. 2. In the absence of the President the first Vice-President shall preside, and in his absence the second Vice-President shall preside.

SEC. 3. In the absence of all three, the Association shall elect one of its members to preside *pro tem.*

SEC. 4. It shall be the duty of the Secretary to keep a true and correct record of the proceedings of the meetings; to preserve all books, papers, and articles belonging to the archives of the Association; to attest all orders drawn on the Treasurer for moneys appropriated by the Association by the seal of the Association ; to keep the account of the Association with its members ; to keep a register of the members, with the dates of their admission and places of residence. He shall collect all moneys due from the members and pay to the Treasurer, taking his receipt for the same. He shall report such unfinished business of previous meetings as may appear on his books requiring action, and attend to such other business as the Association may direct. He shall also supervise and conduct all the correspondence of the Association, and be chairman of the Publishing Committee.

SEC. 5. It shall be the duty of the Treasurer to keep a correct record of all moneys received from the hands of the Secretary, giving his receipt for the same; pay them out by order of the Association as indorsed by the President and attested by the seal in the hands of the Secretary.

SEC. 6. It shall be the duty of the President of the Association to appoint a Committee of Finance, consisting of three members of the Association, whose duty it shall be to examine the books of the Secretary and Treasurer, and report on the same at the next session of the Association.

ARTICLE VII.

Vacancies occurring in the offices of the Association shall be filled by appointment of the President until the next meeting. He shall also have the appointment of all committees not otherwise provided for.

ARTICLE VIII.

This Constitution shall take effect immediately from the time of its adoption, and shall not be amended except by a written resolution, which shall lie over one year, and receive a vote of two-thirds of the members present.

ARTICLE IX.

Any member who for three consecutive years fails to attend the meetings shall be dropped from the roll of membership.

BY-LAWS.

ARTICLE I.

The Southern Surgical and Gynecological Association shall meet annually on the second Tuesday of November at 10 A.M., at such place as may be designated by the preceding meeting.

ARTICLE II.

The members present shall constitute a quorum for business.

ARTICLE III.

The annual dues of each member shall be $10, paid in advance.

ARTICLE IV.

The usual parliamentary rules governing deliberative bodies shall govern the business workings of this Association.

ARTICLE V.

All questions before the Association shall be determined by a majority of the votes present.

ARTICLE VI.

The President shall deliver an annual address at each meeting of the Association.

ARTICLE VII.

The Secretary of the Association shall receive, at each annual Session, a draft from the President, drawn on the Treasurer, for the sum of $100 for services rendered the Association, and to this shall be added the necessary expense incurred in the discharge of his official duties.

ARTICLE VIII.

It shall be the duty of the Secretary, one month prior to the annual meeting, to notify by circular letter the members of the Association, and urge their attendance.

ARTICLE IX.

The authors of all essays shall notify the Secretary, six weeks prior to the meeting, of the titles of their essays, so that they may be incorporated in the circular letter to the members.

ARTICLE X.

COUNCIL.

The Council shall consist of five members; and of those elected at the primary meeting, the first shall serve five years, the second four, the third three, the fourth two, and the fifth one year; so

that subsequently one member of the Council shall be elected annually to serve five years. The President and Secretary shall be *ex-officio* members of the Council.

This Council shall organize by electing a Chairman and Secretary, and shall keep a record of its proceedings.

The duties of this Council shall be—

1. To investigate applications for membership and report to the Association the names of such persons as are deemed worthy.

2. To take cognizance of all questions of an ethical, judicial, or personal nature, and upon these the decision of the Council shall be final; *provided*, that appeal may be taken from such decision of the Council to the Association, under a written protest, which protest shall be sustained by the Association, and the matter shall then be referred to a special committee, with power to take final action.

3. All motions and resolutions before the Association shall be referred to the Council without debate, and it shall report by recommendation at as early an hour as possible.

ARTICLE XI.

The following are the standing committees of the Association to be filled by the President and to report at the next annual meeting subsequent to their appointment, viz.: Committee of Arrangements and Committee of Publication. The Committee of Publication shall consist of three members, one of whom, the Secretary of the Association, shall also be the chairman of the said committee. The Committee of Arrangements shall consist of five members.

ARTICLE XII.

The Committee of Publication shall have full power to omit from the published TRANSACTIONS, in part or in whole, any paper that may be referred to it by the Association, unless specially instructed to the contrary by the Association, which will be determined by vote.

ARTICLE XIII.

Any member failing to pay his dues for more than one year shall be dropped.

ARTICLE XIV.

Every physician making application for membership shall present with his application a paper on some surgical or gynecological subject.

ARTICLE XV.

No paper shall be read before this Association which does not deal strictly with a subject of surgical or gynecological importance.

ARTICLE XVI.

No paper read before the Association shall be published in any medical journal or pamphlet for circulation, as having been read before the Association, without having received the indorsement of the Committee of Publication.

ARTICLE XVII.

The reading of papers shall be limited to twenty minutes each, except by permission of the Association.

MINUTES OF THE PROCEEDINGS

AT THE

TWELFTH ANNUAL MEETING

OF

THE SOUTHERN SURGICAL AND GYNECOLOGICAL ASSOCIATION,

HELD AT THE

ST. CHARLES HOTEL,

New Orleans, La.,

DECEMBER 5, 6, AND 7, 1899.

TWELFTH ANNUAL MEETING.

The following named members were present:

BAXTER, GEORGE A.	Chattanooga, Tenn.
BLOOM, J. D.	New Orleans, La.
BOSHER, L. C.	Richmond, Va.
BOVÉE, J. W.	Washington, D. C.
BROWN, GEORGE S.	Birmingham, Ala.
BURTHE, L.	New Orleans, La.
CARTLEDGE, A. M.	Louisville, Ky.
CATHCART, R. S.	Charleston, S. C.
COCRAM, HENRY S.	New Orleans, La.
CROFFORD, T. J.	Memphis, Tenn.
DAVIS, J. D. S.	Birmingham, Ala.
DAVIS, W. E. B.	Birmingham, Ala.
EARNEST, G. J.	Atlanta, Ga.
ELLIOT, J. B., Jr.	New Orleans, La.
FENNER, E. D.	New Orleans, La.
FORTIER, S. M.	New Orleans, La.
GESSNER, HERMANN	New Orleans, La.
GRANT, H. H.	Louisville, Ky.
HAGGARD, W. D., Jr.	Nashville, Tenn.
HEFLIN, WYATT	Birmingham, Ala.
JOHNSON, JOSEPH TABER	Washington, D.C.
JOHNSTON, GEORGE BEN	Richmond, Va.
KOHLMAN, WILLIAM	New Orleans, La.
LARUE, F. A.	New Orleans, La.
LEWIS, ERNEST S.	New Orleans, La.
LEWIS, HAMPTON S.	New Orleans, La.
LOEBER, F.	New Orleans, La.
McMURTRY, L. S.	Louisville, Ky.
McRAE, F. W.	Atlanta, Ga.
MARTIN, E. D.	New Orleans, La.

MATAS, R.	New Orleans, La.
MATHEWS, J. M.	Louisville, Ky.
MICHINARD, P. E.	New Orleans, La.
MILLER, C. JEFF	New Orleans, La.
MILLIKEN, SAMUEL E.	Dallas, Texas.
NICOLSON, W. P.	Atlanta, Ga.
NOBLE, GEORGE H.	Atlanta, Ga.
PARHAM, F. W.	New Orleans, La.
PARKER, W. E.	New Orleans, La.
PERKINS, W. M.	New Orleans, La.
POTTER, W. W.	Buffalo, N. Y.
ROGERS, W. B.	Memphis, Tenn.
SIMONS, MANNING	Charleston S. C.
SOUCHON, EDMOND	New Orleans, La.
TAYLOR, HUGH M.	Richmond, Va.
TOMPKINS, CHRISTOPHER	Richmond, Va.
WATKINS, I. L.	Montgomery, Ala.
WILSON, J. T.	Terrell, Texas.

Letters and messages of regret were received from a number of members who were unable to attend the meeting.

First Day.—*Tuesday, December* 5, 1899.

Morning Session.—The Association met in the assembly-room of the St. Charles Hotel, and was called to order by the President, Dr. Joseph Taber Johnson, of Washington, D. C., at 10 a.m.

Dr. Henry Dickson Bruns, of New Orleans, was introduced, and delivered the following

ADDRESS OF WELCOME.

Mr. President and Fellows of the Southern Surgical and Gynecological Association: I can conceive that it would require the eloquence of a Richard Brinsley Sheridan or a Fox to extend to you in a brief address such a welcome as you should receive. However, the profession of New Orleans has assigned to me the pleasant duty of welcoming you to our city, which I gladly do. We anticipate a great deal of profit and no little pleasure from your being with us. We are always glad to join in any amenities that can bring together the members of the profession and

promote its friendly relations. We believe that we can promote your pleasure by showing you a city that is, to say the least, unique; a city that has taken its roots from two foreign dominions—Spanish and French—and one of which certainly presents the greatest contrast to be seen in any American city. You will find here a modern office building towering eleven stories into the sky; next, you will see a little Spanish tile roof with a one-story building; you will see a front broad street paved with asphalt. In your walks about the city you will find people speaking no language but the English, and on the street you will be met by middle-aged women who will ask questions and be unable to understand the tongue with which you reply. In the same way, if you visit our hospitals, you will find a range of diseases varying from semitropical leprosy and yaws to smallpox and diphtheria.

We are glad to welcome you, because we are proud to take part in any convention looking to the improvement of the profession of which we are humble ministers. Therefore, in the name of the profession of New Orleans, I most heartily, most emphatically, most cordially welcome you to our hospitals, to our halls, and to our homes. (Loud applause.)

RESPONSE TO THE ADDRESS OF WELCOME BY PRESIDENT JOHNSON.

Dr. Bruns, on the part of the members of the Southern Surgical and Gynecological Association, whose chief executive I happen to be on this occasion, it gives me great pleasure to extend to you our thanks for the very gracious and hospitable words which you have uttered. Some of us have come from distant cities to testify our attachment not only to this Association but to the great cause which it represents. We can only offer you in return the hospitalities of our meeting. We shall be greatly pleased if the members of the local profession which you represent will pay us the honor of attending some of our sessions, not only for the good which comes from the acquaintanceship and the union, but from the professional and scientific advancement and benefit which may possibly be mutual. (Applause.)

Dr. Ernest S. Lewis, Chairman of the Local Committee of Arrangements, made the following verbal report:

REPORT OF THE COMMITTEE OF ARRANGEMENTS.

Mr. President and Fellows of the Southern Surgical and Gynecological Association: The Committee of Arrangements begs leave to report upon its work for the twelfth annual meeting of this Association. The St. Charles Hotel has been selected as headquarters, and also the place for holding the sessions.

The programme for your entertainment will consist in a luncheon at the Boston Club to-day at 12 o'clock, given by the local members. You are also invited to an opera party to-night at 7.45. The French opera is one of the interesting features of New Orleans, and the cast for this evening will be unusually good. *Les Huguenots* will be played. As the overture is a very important feature of this opera, you are requested to be on hand promptly. Boxes will be furnished members and guests.

The Orleans Parish Medical Society will entertain you on Wednesday at 1 o'clock with a steamboat excursion to a neighboring sugar plantation, thus giving you an opportunity of seeing the river front and of being interested and initiated into the interesting process of sugar-making; and we hope that the interest which will be awakened by this visit to the plantation may be the means of inducing some of you to come down to New Orleans and become sugar-planters. A collation will be served on the steamboat to meet the requirements of the inner man.

The Jockey Club has extended an invitation to the members of the Association to attend the races on Thursday. They begin at 2.30 P.M. By wearing one of the badges of the Association, which are little souvenirs of your visit, you will be admitted, and also the ladies of the party.

As a member of the Board of Directors of the Charity Hospital I extend an invitation to the Association to visit this institution. Those of you who were here some years ago will find very great changes. We have constructed a large children's hospital with all modern improvements, and a new amphitheatre, with facilities for more extended surgical work; and we would be glad if, after the meeting of the Association, some time on Thursday, you would fix an hour to visit this great institution. (Applause.)

On motion, the local members of the medical profession were invited to take part in the discussions on papers.

Papers were then read as follows:

1. "Myomatous Tumor of the External Iliac Vein, with Report of a Case," by Dr. A. M. Cartledge, of Louisville, Ky.

Discussed by Dr. Parker.

2. "Ureterectomy," by Dr. J. Wesley Bovée, of Washington, D. C.

Discussed by Drs. Milliken, Noble, and the discussion closed by Dr. Bovée.

3. "Serious Complications Following the Passage of the Urethral Sound," by Dr. William E. Parker, of New Orleans, La.

Discussed by Drs. Nicolson, Parham, Simons, Bloom, McRae, and in closing by the essayist.

4. "Report of Gunshot Wounds of the Abdomen, with Some Statistics," by Dr. H. H. Grant, of Louisville, Ky.

This paper was discussed by Drs. Taylor, Parker, Simons, Milliken, Parham, Bloom, Davis (W. E. B.), McRae, and the discussion closed by Dr. Grant.

On motion, the Association then adjourned until 2.30 P.M.

Afternoon Session.—The Association reassembled at 2.30 P.M., and was called to order by the President.

5. "The History of Pulmonary Insufflation and Artificial Respiration in Intrathoracic Surgery by Intubation of the Larynx, with Exhibition of Apparatus and Demonstration of its Application," by Dr. Rudolph Matas, of New Orleans, La.

Discussed by Drs. Parham, Bloom, and in closing by the essayist.

6. "Rectovaginal Fistula," by Dr. Lewis S. McMurtry, of Louisville, Ky.

Discussed by Drs. Crofford, Johnston, Noble, Haggard, and Bovée.

7. "A Unique Specimen of Pelvic Tumor," by Dr. C. Jeff Miller, of New Orleans, La.

On motion, the Association adjourned until Wednesday, 9.30 A.M.

SECOND DAY.—*Wednesday, December* 6, 1899.

Morning Session.—The Association met at 9.30 A.M., with the President in the chair.

8. "Biliary Calculi," by Dr. W. D. Haggard, Jr., of Nashville, Tenn.

Discussed by Drs. McRae, Earnest, Taylor, Simons, Cartledge, Bovée, McMurtry, Brown, and the discussion closed by the essayist.

9. "Inflammation of Meckel's Diverticulum Simulating Appendicitis," by Dr. William P. Nicolson, of Atlanta, Ga.

Discussed by Dr. Grant.

10. "Report of Two Cases of Intraligamentous Cysts," by Dr. T. J. Crofford, of Memphis, Tenn.

Discussed by Drs. Earnest, McMurtry, Davis (W. E. B.), and the discussion closed by the essayist.

The President appointed as the Auditing Committee, Drs. W. W. Potter, F. W. McRae, and W. D. Haggard, Jr.

At this juncture Dr. McMurtry was called to the Chair, and the President delivered his address.

On motion of Dr. Mathews, a vote of thanks was extended to the President for his able, graceful, and eloquent address.

On motion, the Association adjourned until 8 P.M.

Evening Session.—The Association reassembled at 8 P.M., and was called to order by the President.

11. "Experience in Operations for Typhoid Perforations," by Dr. Hugh M. Taylor, of Richmond, Va.

Discussed by Drs. Parham, Earnest, Noble, Rogers, Wilson, Haggard, Brown, Johnson, and the discussion closed by the essayist.

12. "Four Interesting Cases of Abdominal Surgery: (1) Pancreatic Cyst; (2) Hepatic Calculi; (3) Fecal Fistula; (4) Combined Appendectomy and Nephrorrhaphy," by Dr. F. W. McRae, of Atlanta, Ga.

Discussed by Drs. Cartledge, Lewis, Bovée, Milliken, and the discussion closed by the essayist.

13. "Litholapaxy," by Dr. George S. Brown, of Birmingham, Ala.

Discussed by Dr. McRae, and in closing by the essayist.

On motion, the Association adjourned until Thursday morning, at 9.30 o'clock.

THIRD DAY.—*Thursday, December* 7, 1899.

Morning Session.—The Association met at 9.30 A.M., and was called to order by the President.

14. "Treatment of Retrodisplacements of the Uterus," by Dr. I. L. Watkins, of Montgomery, Ala.

Discussed by Drs. Noble, Taylor, Milliken, and in closing by the essayist.

15. "Report upon Cases of Spinal Injuries Treated at the Louisiana Charity Hospital," by Dr. E. D. Fenner, of New Orleans, La.

Discussed by Drs. Parker, Davis (John D. S.), Baxter, Nicolson, and in closing by the essayist.

16. "Modification of an Operation for Cystocele," by Dr. George H. Noble, of Atlanta, Ga.

17. "Report of Two Cases: Case 1, Seventeen Years' Congenital Nocturnal Incontinence of Urine; Case 2, Pregnancy in a Uterus Bicornis," by Dr. George H. Noble, of Atlanta, Ga.

Discussed by Drs. McRae, Bovée, Simons, Parham, Fenner, and in closing by the essayist.

18. "Perforation of Small Intestine; Gunshot Wound of the Abdomen," by Dr. T. J. Crofford, of Memphis, Tenn.

Discussed by Drs. McRae, Simons, Parham, Fenner, Earnest, Parker, and the discussion closed by Dr. Crofford.

All of the papers whose authors were present having been read, the President called upon the Auditing Committee to make its report.

Dr. William Warren Potter, in behalf of the committee, made the following report:

Your Auditing Committee begs leave to report that it has carefully examined the accounts and vouchers of the Secretary and Treasurer for the past year, and finds that they are absolutely correct without discrepancy of any sort. The Treasury is in excellent condition.

On motion, the report was adopted.

The President then called for the report of the Council, which was read by Dr. Lewis S. McMurtry, as follows:

REPORT OF THE COUNCIL.

The Council met at 10 P.M. and made the following recommendations:

President—Dr. A. M. Cartledge, Louisville, Ky.

Vice-Presidents—Dr. Manning Simons, Charleston, S. C., and Dr. W. P. Nicolson, Atlanta, Ga.

Treasurer—Dr. W. D. Haggard, Jr., Nashville, Tenn.

Place of Meeting—Atlanta, Ga.

Member of the Council—Dr. L. S. McMurtry, Louisville, Ky.

For Membership—

Dr. F. D. Smythe, Memphis, Tenn.
Dr. William Mastin, Mobile, Ala.
Dr. Maurice Richardson, Boston, Mass.
Dr. Samuel E. Milliken, Dallas, Texas.

For Provisional Membership—

Dr. William A. Quinn, Henderson, Ky.
Dr. Wallace Neff, Washington, D. C.
Dr. A. R. Shands, Washington, D. C.
Dr. Hubert A. Royster, Raleigh, N. C.
Dr. Rhett Goode, Mobile, Ala.
Dr. R. S. Cathcart, Charleston, S. C.
Dr. R. C. Goldthwaite, Montgomery, Ala.
Dr. R. S. Hill, Montgomery, Ala.
Dr. W. M. Perkins, New Orleans, La.
Dr. F. A. Larue, New Orleans, La.
Dr. E. D. Martin, New Orleans, La.
Dr. P. E. Michinard, New Orleans, La.
Dr. J. B. Elliot, Jr., New Orleans, La.
Dr. William Kohlman, New Orleans, La.
Dr. L. Burthe, New Orleans, La.
Dr. F. Loeber, New Orleans, La.

For Chairman Committee of Arrangements—Dr. George H. Noble, Atlanta, Ga.

On motion, the report of the Council was adopted.

Drs. Wilson and Tompkins were appointed to escort the newly elected President to the chair.

Dr. Johnson, in introducing his successor, said: It gives me great pleasure to relinquish the presidential chair to my friend, Dr. Cartledge, of Louisville. He does not need any introduction from me. You know him well. He has been with us from the beginning. He has been faithful over a few things, and we believe that he will still be more faithful over the many things for which he has just been elected. It remains simply for me to thank you most kindly and heartily for the courtesy and kindness with which you have treated me during my administration, which, I feel egotistic enough to believe, has been a

successful meeting; but it could not have been except for your kindness and courtesy. I am sure that if you will give Dr. Cartledge half the kind of support that you gave me he will close the century very auspiciously. Again, I thank you for your kindness, and relinquish the chair to him. (Applause.)

Dr. Cartledge, in accepting the presidency, said:

Fellows of the Association: This honor came to me with great surprise. I assure you that never in my life have I had any honor conferred upon me which is as much appreciated. Born in the extreme part of our southern country, by fate or fortune my work has been cast in the middle part of our great country; yet my sentiments, my interest, and, I might say, my pride have been with the South. While all sectional lines have been obliterated in this Association, and it is not considered sectional, because we have with us men from all parts of the country whose membership we highly esteem; yet born in the South, as this Association was, meeting in the South, and organized for the purpose of bringing together Southern surgeons, naturally Southern men felt the greatest possible interest in its welfare.

Whenever I am away from home and the question of medical societies of America comes under discussion, I hear men in the East frequently say that the best medical society in this country is the Southern Surgical and Gynecological Association. I assure you that this does me more good than anything I could hear in connection with society work. And this is a frequent comment. When the members of our great profession across the water, and editors of journals, who have no sectional interests or prejudices against this country, speak in terms of the highest praise of our work; when we see such remarks as appeared in the *British Medical Journal* some four years ago, we should feel a thrill of pride. This great journal, in commenting upon our annual volume of proceedings, said that the *Transactions*, just published, of the Southern Surgical and Gynecological Association, are the best we have seen emanate from America. This is a compliment indeed.

I feel unworthy of the high post to which you have elected me. I have no parliamentary ability, consequently I shall crave your indulgence and support in the discharge of my duties. Let us endeavor to get the best men as members from the sections of country in which we meet. While we do not want a mammoth

society, yet it is necessary to replenish our membership with young blood. Men are apt to forget that they are growing old, and may not be as energetic as they formerly were. But let us by all means keep up the high standing which the Association has at present. Personally, I get more out of this society than of any other of which I am a member. Two or three of the volumes of the *Transactions* of this Association have never been surpassed; they are epoch-makers. Take the programme of the meeting at St. Louis. I do not believe it has ever been equalled by anything that I have seen. The best men of the country were there and took part in the discussions. We have everything to be proud of, everything to inspire us to work; and while our membership is not exclusively Southern, we take pride in calling ourselves the Southern Surgical and Gynecological Association. (Loud applause.)

VOTE OF THANKS.

Dr. Tompkins, of Richmond, Va., offered the following vote of thanks:

Resolved, That the thanks of the Association be extended to Dr. Lewis, Chairman of the Committee of Arrangements, and his associates, for the very enjoyable opera party tendered to us; to the medical members of the Boston Club for their entertainment; to the members of the Orleans Parish Medical Society for the excursion down the river and a visit to the sugar plantation; to the President of the Tulane University for his invitation to visit that institution; to the City Jockey Club for an invitation to visit the races; to the Manager of the Tulane Theatre, who invited us to witness a play there to-night; to the proprietor of the St. Charles Hotel for his many courtesies and concessions; to the local members of the press of New Orleans for their faithful reports of our proceedings; and to the railroads for reduced rates on this occasion.

On motion of Dr. John D. S. Davis the resolution of thanks was unanimously adopted.

Dr. Bovée moved that a vote of thanks be tendered to the retiring President, Dr. Johnson, for the able and impartial manner in which he had conducted the meeting; and also to the Secretary, Dr. Davis, for his efficient services and untiring energy. Seconded, and unanimously carried.

The following papers were read by title:

"Nephrectomy," by Dr. Howard A. Kelly, of Baltimore, Md.

"The Technique of Early Operations in Cleft Palate," by Dr. James E. Thompson, of Galveston, Texas.

"Remarks on Vaginal Hysterectomy," by Dr. H. S. Cocram, of New Orleans, La.

"The Different Phases of Electric Treatment," by Dr. J. McFadden Gaston, of Atlanta, Ga.

"The Immediate Hermetic Sealing of Aseptic Wounds—Is it Safe? Is it Advised?" by Dr. Henry O. Marcy, of Boston, Mass.

"Ligation of Lingual Arteries in Operations for Cancer of the Tongue, with Report of Case," by Dr. W. S. Elkin, of Atlanta, Georgia.

"Beef Gall in the Treatment of Post-operative Obstinate Constipation and Intestinal Obstruction," by Dr. F. C. Ameiss, of St. Louis, Mo.

"Bilharzia Hæmatobia," by Dr. Edwin Walker, of Evansville, Ind.

"Technique of Brain Surgery," by Dr. J. D. S. Davis, of Birmingham, Ala.

"True Conservatism in Abdominal Surgery," by Dr. James T. Jelks, of Hot Springs, Ark.

On motion, the Association then adjourned, to meet in Atlanta, Ga., on the second Tuesday in November, 1900.

W. E. B. Davis,
Secretary.

ANNUAL ADDRESS OF THE PRESIDENT.

By Joseph Taber Johnson, M.D.,
Washington, D. C.

Mr. Chairman and Members of the Southern Surgical and Gynecological Association: The present century is nearing its close, and our society has rounded out a little more than its first decade of existence. This is the time in the year when our people naturally indulge in reminiscences. They take account of stock. If their inventories demonstrate large sales and favorable bank accounts, they are correspondingly prosperous and happy. The day officially appointed, according to custom and tradition, by the head of the nation, for a national thanksgiving has only just passed, and we are rapidly approaching the holiday season, when, with glad hearts we celebrate not only the birth of the Saviour of mankind but the birth of a new year. While we have abundant cause for thankfulness, over the progress and prosperity of our beloved and united country, during the last century, we have equal cause for gratitude and congratulation over the progress of the science to which we have dedicated our lives. If the pioneers in medicine and surgery could stand upon this platform with me to-day, their glad voices would be raised with more than equal pride and satisfaction, with mine, at the wonderful advances in the "healing art" which have been made during the "Twentieth Century of Medicine," to which so many of you have contributed. While we glory with the rest of mankind in all that makes our lives and our homes more prosperous, more comfortable, and more happy, we take especial pride, as medical men, in the scientific growth of our art as a whole, and

in the marvellous development of the particular departments of surgery and gynecology to which this society is especially devoted.

While surgery has been practised in some form since the creation of mankind in the world, its younger sister, gynecology, received its principal impetus, in what was then called the back-woods of Kentucky, by the daring surgico-gynecological feat of McDowell, when this century was only eight years old. We might, indeed our society might, justly claim that this act of the intrepid Kentucky surgeon, constituted a very pleasant union or marriage of surgery and gynecology.

The southern part of our country having furnished so many noted surgeons and gynecologists to the medical profession, the name of our society derives greater appropriateness and significance from this fact. McDowell in 1809, Eve and Dudley later on, then came Sims from Alabama, Thomas from South Carolina, Battey from Georgia, and Emmet from Virginia; while a number of our active Fellows, originating in the South, have transplanted themselves to the larger medical and commercial centres of the country.

The first presidential addresses of our society explained its aims and objects, and prophesied with high hopes, but some misgivings, a prosperous and useful future. Other favorite and honored occupants of this chair pointed out how, by union, association, combined and conjoined effort, we might succeed in accomplishing the objects laid down in the Constitution and By-laws. Still other presidents have discussed from this platform in the most able and eloquent manner, some of the most important scientific questions of the day, and aided greatly in their elucidation and settlement; while others still have proposed and discussed subjects for the improvement and the advancement of the combined interests of this Association.

This seems to be a propitious time in our history—at the end of our first decade, at the end of the year, at the end of the century—to take an account of stock and see if we can give favorable answers to some of the questions raised at the beginning.

But, first, let me thank you most gratefully for the very great honor you conferred upon me at Memphis in electing me to preside over your deliberations in New Orleans. There were many of our Fellows who were more entitled to be thus honored, whose skill and accomplishments far surpassed any of my poor efforts, and my surprise at your choice is only equalled by my misgivings at my being able to acceptably and adequately perform the duties of the high office to which your very great kindness and courtesy have elevated me.

In looking over the excellent programme prepared by our indefatigable secretary, I see so many scientific papers are to be read and discussed at this meeting, that I thought it might be a relief if the president in his annual address, which the rules of the society compels him to make and you to listen to, departed from the custom, usual to occasions of this kind, to inflict upon a courteous and over-indulgent audience another scientific discussion of one of the "live topics of the day," or upon one of the "burning questions of the hour," and, as already suggested, indulged in a few reminiscences, naturally growing out of the time and place and season, in which we find ourselves, in this beautiful and hospitable "Queen City" of the South.

Our Association began its existence with a membership of 97, and our first volume of Transactions contained 18 papers on surgical and 10 on gynecological subjects. Our last volume of Transactions showed the roll had been increased by the addition of 43 members, and had more than doubled in size and importance as a book of reference for our library shelves.

The literary and scientific value of our eleven volumes of Transactions compare favorably with those of any other surgical or gynecological societies in the country, and afford us not only great satisfaction in this respect, but constitute a source of pride and congratulation at the growth, usefulness, and solid prosperity of the Association itself. Our early presidents were right then in their prognostications. There was room for our new organization. That "a need long felt"

was met by its organization is evidenced by its steady growth in membership, in the number and high character of its papers, and the scientific and interesting discussions which followed. The society has lost some of its distinctly sectional and local features, as shown by its election of Fellows from quite a number of the Northern and Western States, and bids fair to become a national organization before the rapidly approaching century is many years old. It is to be hoped that the Association will never lose its distinctly Southern characteristics by this beneficent widening of its scope of membership and usefulness.

The hope was expressed by Hunter McGuire, in the second presidential address, that Southern men living in districts remote from the principal medical centres would unite with the society, as well as those in the smaller cities and towns, while the surgeons and gynecologists of the larger cities would of course be found among its earliest supporters. This hope I am glad to state is being realized, and the real missionary work of the society in its annual visits to our various Southern cities is being felt and acknowledged.

The increased acquaintance and fraternal association, the interchange of views and opinions which were recommended as so desirable and valuable by our members, so widely separated from each other, in this very large section of country, *has* taken place at our meetings, and the results anticipated have been accomplished. The founders of the society builded better than they knew. Members and visitors *both* have received new inspiration from the papers, and still more from the discussions, and have returned to their homes with their ideas quickened, and the beaten paths, in which they had been treading in a routine way, broadened and illuminated.

At the end, then, of the Association's first decade our inventory will disclose the fact that we have produced ten, and up to this date eleven, volumes of Transactions, of which we may justly feel proud. They indicate an increasing interest and record a larger membership. The papers, discussions, reports, and addresses exhibit a progressive and scientific spirit, accuracy of observation, diagnostic and operative skill.

In general appearance of paper, type, and binding they are among the handsomest volumes in our libraries.

This would seem a fitting time to acknowledge the deep and lasting debt of gratitude we owe to our chief executive officer, the untiring, devoted, and universally loved secretary. All the words of praise which have been said of Dr. Chadwick, in regard to his skill in organizing and wisdom and executive ability in managing the early affairs of the American Gynecological Society, would apply with equal justice and force to Dr. Davis in his labor of love in providing programmes and carrying on to a successful termination our meetings in the various parts of the country in which they have been held. The members of a society scarcely realize the amount of work which is represented by the finished programmes and volumes of Transactions which reach them through the mail. The ordinary notices of the time and place of meeting, the solicitations of members to write papers, their orderly and systematic arrangement in groups, their assignment to particular days and hours to suit the wish or convenience of their authors, the preparation for the printer and the subsequent interviews with that important personage, the large correspondence, his necessary and prompt attendance at all the meetings of the Society and of its council, the reconciling of many conflicting interests, the securing of the papers, in proper form for the printer, from their frequently dilatory authors, the editing of the discussions, and, finally, of the entire volume of Transactions in the very creditable and elegant shape in which it finally reaches us. For all this eleven years of work in our behalf we owe our secretary a very large debt of gratitude.

While we are taking our inventory and determining the fact and extent of our prosperity, let us appreciate our obligations and place the credit where it is due. When we are considering this subject it is well to ask ourselves if we have all done our duty equally well. Our programmes have been most excellent, but could they not have been better? could we not all of us have helped more? and have we met even our *own* views of our duty in attendance upon the annual meetings, in

the reading of papers, and in the discussion of questions? The method of electing officers and deciding upon the time and place of meeting being very wisely placed in the hands of a council composed of ex-presidents, the society is relieved of all the distracting and exciting medical politics which disrupt and disintegrate so many similar bodies. Our harmony and the kindliest fraternal feeling have prevailed to such an extent as to constitute one of the prominent *causes* of our prosperity. The councils of our early presidents have been followed in this respect and with the very best results.

While we are prosperous and helpful to each other, and to the various communities in which we have held our meetings, we might still be more prosperous, and could not fail to be if each member felt it incumbent upon him to attend at least two out of every three meetings, and to do his whole duty by the programme or in the discussions.

It was said by the elder John Jacob Astor, that it was comparatively easy to get rich, but the great difficulty was to keep his wealth after he had acquired it. So it may be with our Association, after all the care and thought and the labor and skill which have been expended to bring it to its present high standard of usefulness and prosperity. "Eternal vigilance" will just as certainly be the price of continued success as it was the price of liberty when the now famous aphorism was first uttered. Referring again to some of the early misgivings, lest the sparsely settled districts in some parts of the South should prevent that union of aim and sentiment so necessary to the success of a society of this kind, it is a pleasure to draw attention to the fact that these fears have not been realized to any serious degree. Surgery and gynecology as affected by climate, by high and low altitudes, by residence along the watercourses and in certain peculiarly situated environments, far interior settlements, remote from the influences of city life, all are subjects for exceedingly valuable investigation and report. Dr. Matas, of this city, has already contributed papers of remarkable interest and permanent value upon what might be denominated, in a comprehensive way, the surgery of the colored

population. An interesting subdivision of this subject might be made by a comparative investigation into the effects of injuries and surgical operations upon the different shades of color—pure blacks, mulattoes, quadroons, etc. The impression has prevailed that these people stood the effects of surgical operations badly, but recent reports of surgeons indicate that such is not the case. Their stolid indifference in some cases, and blind confidence in others, might account for the absence of shock and of the nervous element. In abdominal and gynecological surgery this is certainly a noticeable factor.

Speaking in a numerical and geographical sense, that part of our country called the South, and embraced by lines drawn from the Potomac River to the Gulf of Mexico, and from the Atlantic Ocean to the Rio Grande, includes so much sparsely settled territory that the country doctor must have varieties of work and rich experiences, which would be of the greatest value and should be reported by our members for record in the Transactions. His own personality and his devotion to duty, not infrequently under circumstances of the greatest hardship and self-sacrifice, have been heralded in poetry and song. Ian Maclaren has given us a very complete and pathetic description of the labors of the country practitioner in his account of the life and services of Dr. Maclure, in the glen of Dumchocty, which his many admirers in this country have read amid smiles and tears, as the rough and tender, the ever ready, and always skilful, shades of the doctor's sturdy character are depicted. Not long ago a beautiful painting representing a pathetic scene in the life of the country doctor brought at auction the enormous sum of $10,000. So many hearts were touched by the sad story represented upon the speaking canvas that the lively competition resulted in the price just named. The country doctor who has kept himself up to date by occasional visits to the city hospitals, where he now and then takes a surgical case, and who himself often spends his well-earned vacation in attendance upon a post-graduate course, is really a more accomplished all-round man than his city brother who is devoting himself exclusively to

special work, with office hours from 9 to 12 only. Someone, fond of collecting information, could no doubt write a large book upon what some country doctors don't know; but it is quite possible that another volume could be published upon the defects of some of those more fortunately and comfortably situated. Will Carleton, in a poem which mainly deals with the griefs of a country community over the death of their aged medical guide, counsellor, and friend, after referring to his useful and busy life spent in their interest, says:

"Maybe half the congregation, now of
Great or little worth,
Found this watcher waiting for them
When they came upon the earth.
This undecorated soldier, of a hard,
Unequal strife,
Fought in many stubborn battles
With the foes that sought their life.

"In the night-time and the day-time,
He would rally brave and well,
Though the summer lark was fifing,
Or the frozen lances fell,
Knowing if he won the battle,
They would praise their Maker's name,
Knowing if he lost the battle,
Then the doctor was to blame.

"But perhaps it still is better
That his busy life is done.
He has seen old views and patients
Disappearing one by one.
He has learned that death is master,
Both of science and of art,
He has done his duty fairly,
And has acted out his part.
And the strong old country doctor,
And this good old country doctor,
Is entitled to a furlough,
For his brain and for his heart."

During a recent consultation visit to an interior Virginia village one physician came in late, saying he had but just re-

turned from a fourteen-mile ride in the country to see a poor old woman, in a cabin, who had not long to live. He was asked what fee he received for his twenty-eight-mile drive, and he replied that they had fed and watered his horse while he was in the cabin—that was all. She wanted him, and he had gone, just to comfort her. He had not the heart to refuse her call.

If to the heroism and the tireless devotion to duty of these brave men could be added the diagnostic skill and therapeutic wisdom which may be developed in an association like ours, we would have a race of country doctors in the vast and sparsely settled districts of this great south land of ours which would be wellnigh invisible. The poet could no longer sing of him *then*—

> "But perhaps it still is better
> That his busy life is done.
> He has seen old views and patients
> Disappearing one by one."

S. Q. Lapius, in poetic vein, speaks in part in this wise of

> "The country doctor, him whose life
> From sun to sun is daily rife
> With bootless toil, and ceaseless strife,
> Whose sturdy frame is made to feel
> The summer's flame, the winter's steel,
> I come to sing in praise of him.
> His soul is fat, his purse is slim,
> His eye-sight keen, his fore-sight dim,
> For caring naught for power or pelf,
> While there's a crust upon the shelf,
> He works for fun, and boards himself.
>
> "Ah! Ye who traverse city streets
> On swaying springs and quishened seats,
> The difficulties that he meets,
> The bumps and jolts, ye little know.
> Through seas of mud, o'er wastes of snow,
> Where icy tempests howl and blow,
> In pouring rain, where torrents flow,
> And sheen and shadow come and go,
> Astride the sorriest of nags,
> And armed with spur and saddle-bags,
> He onward works his way.

And be it night, or be it day,
He never falters nor looks back.
Adown the steep and rugged track,
He sets his teeth and onward plods,
Himself a clod among the clods.

"I've said 'a clod among the clods,'
'T were better a 'God among the Gods.'
For sacrificing hours of ease,
And striving hard to do and please,
And winning but the dregs and lees
Of life's sweet wine, he fights disease
With clinched hand and bated breath,
And knows no conqueror but death."

The objects of our founders are being realized and this season of thanksgiving, celebration, and congratulation is one in which we can mingle and rejoice with the rest. The practical needs of life are brought out in our debates and papers submitted for discussion. If a man's development has been oblique, or his evolution the product of wrong teaching and of mistaken practice, the friendly criticisms and presentation of more correct and scientific methods of thought and practice will do him good and soon set him on the right track again, if he is made of the right kind of stuff.

The practice of surgery and gynecology brings our membership very near together, and it is not at all impossible, as the signs of the times are interpreted, that gynecology, as a separate and separated specialty, may gradually cease to exist as such, and become absorbed into the larger and more general department of surgery.

The best gynecologists are now the best surgeons as far as they go. In abdominal, pelvic, and genital surgery few general surgeons equal and none surpass him. His field of work is more narrow but none the less perfect and important on that account. While many gynecologists might take exception to such an absorption of our specialty, the gradual expansion of our work out of the female pelvis gives the most potent argument for such an occurrence in the no distant future.

It is not difficult for most of us to remember when gynecology was limited altogether to vaginal and pelvic work. Now there are very few gynecologists of note who are not operating upon any tumor or lesion between the diaphragm and the vulva.

We attack ulcers and abscesses of the stomach and anastimose that organ with the intestines. We do all the surgery of the kidney and the ureter, of the liver and the gall-bladder, of the intestines, the spleen, and the pancreas. We operate for appendicitis and for all the varieties of hernia, and do the surgery of the bladder, the rectum, and the mammary gland.

We operate for gunshot and stab-wounds of the abdominal viscera upon men, women, and children, and invade the field of the truly medical practitioner in cases of perforated typhoid ulcers. It is very difficult to say where the office of the gynecological surgeon leaves off and where that of the general surgeon begins. Each are doing the other's work now, to the extent already mentioned, with this difference, that while most general surgeons are doing all the operations in gynecology, there are no gynecologists who are yet doing all the operations of general surgery. It may be more difficult at the end of one or two more decades to make a differential diagnosis between them. The union of surgery and gynecology in our Association has done much to bring together the men devoting their lives to these two great departments of medicine, and may possibly do much more in the coming century to wipe out the lines of demarkation which now separate them.

A tendency toward simplification and unification in the affairs of Church and State is one of the noticeable features of our times. Much of the bitterness in the discussions of religion and politics is passing away, and who knows but that in the evolution of events, the general surgeon and the gynecologist may soon lie down together, and a little child may lead them.

We have much to congratulate ourselves upon in the achievements of the past. Ours is the proud satisfaction of saving human life and mitigating human suffering. This knowledge

is the greatest stimulant to continued and persistent effort to so perfect our work as to rob disease of its terrors, and to save our dear ones and those intrusted to our care, in the future, more than we have been able to in the past, from the distressing results of disease and the accidents of life.

It was computed some time ago that the perfected operation of ovariotomy *alone,* since the time of McDowell, had added 100,000 years to the lives of women. Antiseptic surgery can claim almost as much, while anæsthesia has robbed all surgery of its pain and made possible many of the marvellous achievements of our profession. When we stop to consider the startling progress in the arts and sciences, even in our own times, who can say what discoveries will be made, during the lifetime of many present here to-day, which will give us an antidote for cancer and tuberculosis, yellow fever and cholera, the bubonic plague and general septic peritonitis. We pride ourselves upon the ease and comfort and luxury which the inventions and discoveries of the nineteenth century have brought to us in all departments of labor and of life. The ancient Roman citizen and the ancient courts and emperors felt the same pride. But let us not follow their disastrous examples of contentment, indifference, and luxurious idleness. While Nero and his profligate court luxuriated in the results of conquests and the wealth appropriated by their conquering armies, even they little dreamed of the ordinary comforts and cheap conveniences enjoyed by the entire population of our country and of our times. The royal chariots and the fleetest of steeds are now outdone by steam carriers and electric cables; their relays of messengers on horseback, by the telegraph and telephone; their torches and bonfires have given place to illuminating gas and electric lights. Cold storage has revolutionized certain departments of labor, while the use of the antiseptic principle has done as much for other departments, including the practice of surgery and gynecology. But we cannot afford to rest on the accomplishments of the past, but must continue, unremitted, our efforts until the last great enemy is conquered, as far as human efforts can conquer him.

The possibilities of liquid air and wireless telegraphy may develop into great aids to the surgeon and gynecologist. One of the great advances made in the recent past is our efforts in the direction of conservative in contradistinction from sacrificial surgery. We believe now that it is a greater triumph of surgery to save a part than it is to sacrifice it. Resection is better than amputation; enucleation redounds more to the reputation of the gynecologist than the radical removal of the parts involved. More responsibility rests upon him who excises the uterine appendages than upon the surgeon who amputates a leg or an arm. The remote effects of these operations differ very widely so far as the social and domestic happiness of the patient is concerned. The gynecological surgeon who trains his skill in the direction of eradicating the diseased parts, and leaving one ovary and tube or a portion of the ovarian stroma in one appendage, does much more for the future happiness and present comfort of women and the fame of surgery than that surgeon does who recklessly and ruthlessly cuts out these important organs whenever he has opened the abdomen on their account.

True conservatism *versus* radicalism will be one of the important problems for the honest workers of the coming century to solve.

But, gentlemen, I have detained you too long already with these desultory remarks, which were intended to rest and cheer you rather than to add to your intellectual labors of the day. We have much to be grateful for, much cause for felicitation and congratulation, and much to encourage us as we look into the future.

With the achievements and the memories of the passing century as a stimulus and as an inspiration, let us see to it that the shield of our glorious inheritance is in nowise tarnished by its passage through *our* hands *on* to posterity.

URETERECTOMY.

By J. Wesley Bovée, M.D.,
Washington, D. C.

Surgery of the kidney is practically of recent date, although during the sixteenth, seventeenth, and eighteenth centuries the practicability of nephrectomy had been discussed, and Zambeccarius, in 1670, and Roonhuryzen, in 1672, had proved by experiments on animals that one kidney could do the work of both. It may fairly be stated that Simon's successful nephrectomy in 1869, though done in an emergency and for an indication not now recognized, marks the beginning of the surgical treatment of this very important organ.

Surgery of the ureter was the logical sequence to renal surgery. Yet, strangely enough, Gigon[1] had thirteen years previously published a case of calculous anuria, recommending and carefully describing the technique of ureterectomy—called by him "ureterotemnie," and practically followed years later by Le Dentu and Pozzi.

The interest in this subject has not lagged, and at the present time nephrectomy for injuries and diseases of the ureter is called for extremely rarely. Now, calculi are removed from the ureter by incision; injuries to it closed by suturing or drainage; strictures relieved by delicate plastic operations, curing many cases of hydronephrosis in this way; resections for complete section of it, either accidental or intentional, are easily and safely done, about twenty cases bearing evidence of this; and even its entire removal has been practised nine times with gratifying results. It is furnishing the surgical world to-day the richest field for perfect, delicate, and scientific operative work.

(This paper has essentially to consider the subject of ureterectomy, an operation less than nine years old, one seldom indicated, but offering brilliant results.)

By the term ureterectomy is generally understood the *partial* or *complete* removal of the ureter. It may be done *primarily* with nephrectomy, thus making nephrectomy and partial ureterectomy, or, if entirely removed with the kidney, *nephro-ureterectomy.*

Secondary ureterectomy is practised sometime after nephrectomy or nephrectomy and partial ureterectomy. The sequence of operations in the second case ever done was nephrectomy and primary partial ureterectomy, two months later secondary partial ureterectomy, and five months after that the remainder removed by a third partial ureterectomy. Partial ureterectomy is nearly always done when the kidney is removed, part of the pedicle being formed from the upper end of the stump of this duct. Total ureterectomy was first done in 1893 by Poncet. Partial ureterectomy, first performed by Tuffier[3] in 1891, has since been done ten times. (See table.) The writer believes many unrecorded ureterectomies have been done, and the chief *raison d'etre* of this paper is to prompt the publication of reports of such as well as future ones. As ureterectomy is as yet a new operation, it would seem to be of the greatest importance to record anything new or additional concerning it. It is this sense of professional duty that prompts me to mention my case, the history of which is as follows :

Mr. J. J. T., aged forty-eight years, was first seen with Dr. Emory Reisinger, of this city, in August, 1898. Three years previously his left kidney had been removed for a renal abscess, and at a subsequent time another operation had been done by the same surgeon for the remaining pus tracts and severe localized pain. He told me he had been an invalid constantly since before the first operation, and begged for relief. He had never been without pain, and was frequently obliged to resort to the use of morphine. I found him in a very much enfeebled condition, his pulse ranging from 110

to 130, and his temperature from 99° to 101.6°. On the left anterior and lateral aspects of the abdomen, slightly below the level of the umbilicus, were two scars of the previous operation. One of them was so near the median line that I am inclined to think that nephrectomy had been made transperitoneally. A large hernia had occurred at this site. There were three sinus tracts in the left lumbar region discharging a thin, watery pus. In spite of his general weakness, I decided an exploration to be advisable, and accordingly, on August 17, 1898, after free stimulation, he was anæsthetized.

With the valued assistance of Dr. Reisinger a careful exploration was made through an extraperitoneal incision, reaching from just above the level of the upper fistulous opening and in front of the left quadratus lumborum muscle to an inch inside the anterior superior iliac spine. By careful dissection and holding probes in the fistulæ the former location of the kidney was reached. Instead of the kidney a large amount of adipose tissue, containing many pus tracts and calculi and much cicatricial tissue, was found, and a little below it the upper end of the ureter surrounded by calculi and thickened pus. The ureter was of about one inch in diameter, and filled with cheesy pus and calculi. I resolved to remove the duct, and immediately extended the incision along to the inguinal canal, keeping about one inch from Poupart's ligament. With considerable difficulty, but with very slight blood loss, the ureter in pieces was removed to the bladder wall. The distended lumen ended abruptly about half an inch from the bladder wall, this portion being a solid cord.

The wound was closed with through-and-through silkworm-gut sutures, a strip of iodoform gauze being passed to the lowest point of the pelvic wound and brought out at the lower end of the external incision, and another strip in the space formerly occupied by the kidney. The unusual atmospheric high temperature and humidity probably assisted in producing the fatal issue seventeen hours later.

Two pieces of the ureter were sent to Dr. H. A. Kelly, who very kindly sent me the following report from his pathologist:

"The specimen consists of the ureter in two pieces, 8.5 and 6.5 cm. long, and varying from 0.5 to 1 cm. in diameter. Its walls are from 1 to 2 mm. thick and consist of a dense fibrous coat lined with caseous material, which also fills the lumen of the ureter. Histologically, the lining membrane of the ureter consists of diffused tubercular tissue, chiefly composed of large epithelial cells and hyaline material, with here and there definite distinct tubercle and an occasional giant cell. This membrane merges into the caseous material which fills the lumen of the ureter, and externally is limited by a zone of round-celled infiltration. The remaining portions of the wall consist of fibrous tissue and a few small muscle bundles. The fibrous tissue is poor in cells and to a great extent has become completely hyaline.

Diagnosis. Caseous tuberculosis of the ureter.

The specimen had very much shrivelled when it was sent to Dr. Kelly, having been kept for about five months in a solution of formaldehyde. At the time of its removal its lumen easily permitted the introduction of a finger. In this case the original trouble was probably renal tuberculosis, or possibly a pyonephrosis from stricture of the ureter, complicated by the formation of calculi, some of which were not removed with the kidney, as they were found in that region and in the ureter at this operation. The tubercular ureteritis descended almost or quite to the bladder, although a stricture near the bladder may have been the original site of the disease. If it was a descending ureteritis then bladder tuberculosis would likely have ensued if the patient had survived.

History. Thus far total ureterectomy has been performed nine times, the first being done by Poncet,[4] who, on October 18, 1893, did a secondary operation. In 1895, McCosh did a secondary total operation, and in 1895 and 1896 Kelly[2] operated twice, removing both the kidney and ureter. In the latter year McCosh[16] did the same on a man, and Gerster[5]

the sixth operation; Hartmann[6] and Morris[7] two in 1897, and mine, the ninth, in 1898. In Morris' case part of the kidney had been removed previously by another surgeon, and Morris removed the remainder of the kidney with the ureter. The first ureterectomy, however, was a partial one, done by Tuffier, in 1891, during a nephrectomy. In 1892, Reynier[8] removed the ureter in piecemeal; Kelly, in 1893, removed a kidney and ureter to the middle of the pelvic portion, and in 1894, Postnikow[9] removed the kidney and a large portion of the ureter. Since then Schiller[18] has done a primary partial; Morris one primary and one secondary; Sommers,[19] Pouisson,[10] Elliot,[11] and Abbe[17] each one, the two latter removing the kidney at the same time. Thus, as seen from the accompanying table, the total operation has been done nine times, with one death, and the partial eleven times, with one death. Four total nephro-ureterectomies have been done with no death, and partial ureterectomy with nephrectomy eight times with one death.

Indications. It is generally believed that the ureter should be removed with the kidney whenever it appears, either by inspection, exploration, or palpation, to be markedly diseased. If the kidney be removed for tubercular disease the ureter is extremely likely to be involved in the same pathological process to a greater or lesser extent, from above downward. In such cases at least a partial ureterectomy will be demanded. However, as it is often impossible to differentiate at the time of operation between healthy and tubercular ureters, the whole organ should be removed, other conditions permitting. When the kidney is the primary seat of tuberculosis and a descending tubercular ureteritis follows the process advances most rapidly along the mucosa. This being true, it is readily understood that the invasion may be far greater than can be detected with the paraphernalia at hand during a nephrectomy. The same applies to malignant disease, only, perhaps, less positively. It would seem that to remove the kidney for malignant disease and allow an unhealthy ureter to remain is not calculated to tranquillize the conscience of the surgeon.

Yet we know the lymphatic current from the kidney is not toward the ureter, but in the opposite direction. In Abbe's case, done for sarcoma of the kidney, the specimen was examined by Dr. Prudden, who reported "the ureter springs from the central part of the tumor, and is considerably thinned and dilated." Nothing more is said of this duct removed, with a sarcomatous kidney weighing four pounds, from a child weighing fifteen pounds. Walker found in sarcoma of the kidney in children the ureter and bladder were involved in but three of one hundred and twenty cases. In the very few cases of sarcoma of the kidney operated and survived beyond three years the ureter was not removed to any extent, which fact strengthens the improbability of such extension. When we consider the ureter and bladder are liable to constant inundation by the products of kidney disease such freedom from similar lesions is remarkable. Forms of severe ureteritis other than tubercular demand removal of this canal. If old dense strictures of cicatricial tissue are formed in the ureter, causing obstruction with consequent dilatations higher up, there can be no better treatment, if the kidney is to be sacrificed, than to remove this duct as well. There are many conditions of the organ that demand its removal. Ordinary urinary fistula in an otherwise normal ureter has no place in the list of conditions justifying nephro-ureterectomy or nephrectomy. Such conditions may be nicely relieved by simply suturing the ureter, or by drainage, or, perhaps, resection. The same plan is applicable when a number of fistulæ are present, though one can understand the number of them may be too large for the successful application of either uretero-ureteral anastomosis, transplantation into the bladder or other viscus or even to the periphery. Small ureteral fistulæ often close without surgical treatment other than good drainage. This treatment is so satisfactory that some surgeons advocate it in place of suturing the duct, even when the latter is quite convenient. Primary malignant disease of the ureter is not very common if the literature of the subject may be allowed to guide us. Yet, as ureteral surgery advances a different

aspect may be presented. It would seem the intimate relation between this duct and the peritoneum would favor early extension of cancer or other form of malignant disease of the ureter, and offer but a short space of time for the possibility of its eradication. Syphilis may play such an active rôle here as to cause incurable or impermeable strictures, and in that event ureterectomy might be indicated, though exceedingly rarely. Hydro-ureter with hydronephrosis will in some cases require entire removal of the ureter and kidney, as in Postnikow's case. Thus far the operation has been done twenty times, in fourteen of which the diagnosis was unequivocally tuberculosis. In four other cases such terms as "empyema ureter," "hydro-ureter and hydronephrosis," and "thick and hard ureter with pus," were employed in explaining the condition. In one it was removed with a sarcomatous kidney, and in another for "traumatic hemato-hydronephro-ureterosis." In one case (Reynier's) the condition followed typhoid fever. Excruciating pain in the region of the ureter, especially if sinuses are present, will often call for at least exploration and probably ureterectomy. It is generally the result of leaving behind a diseased ureter, very common after nephrectomy for kidney tuberculosis. We must not forget, however, that considerable of the lower portion of the ureter may be dispensed with by the employment of some form of anastomosis,[12] thus saving the kidney function, and even the bladder has been completely removed with success[13] for growths of various kinds as well as for tuberculosis. So that ureterectomy is not called for in all serious forms of ureteral disease. Just why thirteen of the nineteen persons operated in which the sex is given were females is not easily explained.

As practically all cases done thus far were for tubercular disease, recognition of the conditions calling for the operation should not be difficult. In this disease—in every case thus far—the enlargement was marked and the duct could be easily palpated in the upper part of its course, especially during nephrectomy. In its lower part the rectum in the male and

the vagina in the female offer very good facilities for its palpation. The employment of the ureteral bougie and catheter are exceedingly valuable adjuncts in exploration and diagnosis. Then the marked symptom of localized pain, often of an excruciating character, changes in the urine, particularly those of a bacteriological character, lead to a proper conception of the condition. Often troublesome fistulæ are present, which add largely to the valuable data concerning the condition. Pregnancy seems to aggravate the symptoms. In Tuffier's case incontinence of urine had been continuous since childhood, showing some relation of that trouble with the condition of the kidney and ureter. The condition of the opposite set of organs must give the surgeon great concern in ureteral and kidney surgery. This is often quite difficult of determination. *Apropos* of this, the following interesting case of right hydronephrosis in a girl is reported from Czerny's clinic. She had a tubercular history, but no bacilli were found, and she was kept in the hospital for a long time to ascertain the condition of the left kidney. It was obtained accidentally by Koch's tuberculin. The general reaction was not violent, but locally sensations present in the region of the right kidney were increased. In a few hours after the injection she passed perfectly clear urine, free from pus, in considerable quantity, of normal specific gravity, and containing no albumin. The experiment was repeated several times with the same result. The diagnosis made was tuberculosis of the pelvis of the right kidney and part of the ureter. The explanation offered for these phenomena is that the tuberculin caused swelling and occlusion of the right ureter, thus permitting the urine from the healthy side to be passed uncontaminated. After the pain subsided and pus again appeared tubercle bacilli were found, which were thought to be due to disintegration of tubercles. Czerny did a nephrectomy and found multiple cheesy abscesses in the kidney and a thickened ureter.[20]

Prognosis. The operation is not necessarily a dangerous one, depending largely on the general condition of the patient. The mortality-rate thus far is 10 per cent., the two deaths

being in very much enfeebled patients, which probably would have resulted differently in an early stage of the disease. When an operation done in practically an unknown field gives such good results it is not over-sanguine to expect the mortality-rate to markedly decrease as experiences multiply.

Methods. For removal of the ureter two principal methods have been employed: the transperitoneal and the extraperitoneal. It would seem the former would but rarely be indicated, especially as pus, either tubercular or otherwise, is so constant in the condition demanding the operation, the danger of infecting the peritoneum very marked, and as the ureter lies completely outside this structure, its removal by the extraperitoneal route would seem to be the proper one from an abstract surgical stand-point. In the primary operation, however, with a large kidney tumor the transperitoneal is the most convenient. Seventeen cases have been done by the extraperitoneal route, one by combined extraperitoneal and vaginal, and two by the transperitoneal. Certainly the upper part of the duct is reached with greater facility through the loin, especially in the primary operation. In women the lower end is most easily reached through the vagina, and Kelly found a small opening into the peritoneal cavity just above the pubes of great assistance in one case. The whole length of the duct is much more easily treated in the male, as the broad ligament and ovarian and uterine vessels furnish difficult complications. The parasacral route for reaching the lower part of the ureter has been recommended by Morris[14] and others, but is probably inferior to the combined inguinal extraperitoneal and the vaginal. Probably the best incision for total extirpation of the ureter begins about one inch below the twelfth rib, just to the outside and front of the sacro-lumbar mass of muscle. Its course is then directed downward to an inch inside and above the anterior superior spine of the ilium, and, paralleling Poupart's ligament one inch above it, it may be carried inward as far as necessary. Usually to its middle is sufficient, but a longer distance is easily secured. In the male this incision will give access to

the whole length of the ureter, and in the female to all of it above the broad ligament.

Technique. After making the incision mentioned through the fascia, muscle, etc., care is necessary not to penetrate the peritoneum. By careful dull dissection it will be recognized, and the ureter, if large, will be quite easily noticed. If smaller, it can still be detected attached to the separated peritoneum. When the kidney has been removed some time the search for the upper end of the duct is very often perplexing. Concerning his case, Gerster says: "The most difficult portion of the task was to find the renal end, which was searched for in a large cicatricial mass closely connected with the peritoneum," and Abbe found the same difficulty. This may be avoided if in nephrectomy the practice of fastening the end of the ureter in the lower end of the incision is followed. This procedure furnishes a definite location for it, a secondary ureterectomy being much more easily accomplished. When the peritoneum has been raised from the rest of the abdominal wall all along the duct, care being necessary to avoid injury to the round ligament and arteries about the inguinal canal as well as the spermatic cord in prolonged incisions, the ureter may be completely separated, though much danger of opening the peritoneum exists. In the female, if complete exsection seems necessary, the vaginal roof is incised along the course of the ureter. The ureter is to be ligated before being severed, and, as further precautions, cauterization of the stump and suturing of the mucosa of it have both been recommended. In my case these were unnecessary as the intravesical portion was solid. The uterine artery is in a dangerous location, and may require ligation. Great care is necessary to not injure the sigmoid flexure or the cæcum, under which the ureters pass, the ovarian vessels, which cross and re-cross them, and the uterine arteries which also cross them. Kelly found it necessary to split up the bottom of the broad ligament in order to remove the portion of the ureter passing through it. As in many of these cases considerable pus is present and a large cavity left, owing to separation of

the peritoneum, which permits oozing to occur and fluids to accumulate in the pelvis, it is best to carry down to the lower end of the wound a strip of gauze. Another may be needed in the upper end. The wound, except drainage spaces, may be closed by buried or through-and-through suture.*

COMPLETE URETERECTOMIES.

Date.	Name.	Operation.	Indications.	Result.	Sex	Remarks.
Oct. 18, 1893	Poncet	Secondary.	Chronic descending tubercular ureteritis.	Recovered.	F.	Extraperitoneal; removal of tubercular kidney in March, 1891.
1895	McCosh	Secondary.	Tubercular ureter.	Recovered.	.....	Nephrectomy for tubercular kidney 18 months previous.
Dec. 18, 1895	Kelly	Primary.	Tubercular ureter.	Recovered.	F.	Extraperitoneal; sharp oozing from external iliac vein.
1896	Kelly	Primary.	Renal tuberculosis.	Recovered.	F.	Combined extraperitoneal and vaginal with short abdominal incision.
1895 or 1896	McCosh	Primary.	Tubercular kidney and large perinephritic abscess.	Recovered.	M.	Ureter the size of small intestine, obstructed a half inch from bladder
Nov. 13, 1896	Gerster	Secondary.	Empyema of ureter.	Recovered.	M.	Extraperitoneal; nephrotomy and nephrectomy in 1893.
Jan. 14, 1897	Hartmann	Secondary.	Tuberculosis	Recovered.	F.	Extraperitoneal: nephrectomy and fixation of ureter in bottom of wound one month before.
Sept. 21, 1897	Morris	Primary.	Tubercular kidney and ureter.	Recovered.	M.	Extraperitoneal; part of kidney removed in January, 1897.
Aug. 18, 1898	Bovée	Secondary.	Tubercular ureter.	Died.	M.	Extraperitoneal (see case-history).
Oct. 18, 1893	Poncet	Secondary.	Chronic descending tubercular ureteritis.	Recovered.	F.	Extraperitoneal route; removal of tubercular kidney in March, 1891.
1895	McCoch	Primary.	Same as preceding.	Recovered.	F.	Extraperitoneal; sharp oozing from external iliac vein.

* Since this paper was written I find to add four cases of complete ureterectomy.

E. Garceau. Secondary Operation, Tubercular Ureter, Female, Combined Loin, Extraperitoneal and Vaginal, November 24, 1897. Recovery. Boston Medical and Surgical Journal, 1899.

Le Dentu. Primary, Male, Papillomatous Tumor at Vesical Orifice of Ureter. Recovery. Semaine méd., 1899.

G. H. Noble. Primary Operation for Tubercular Kidney and Ureter. Recovery. December, 1899.

E. E. Montgomery. Primary Operation for Tubercular Kidney and Ureter in a Woman. Recovery. The two latter are unpublished. January, 1900.

INCOMPLETE URETERECTOMIES.

Date.	Name.	Operation.	Indications.	Result.	Sex	Remarks.
Feb. 22, 1891	Tuffier	Primary.	Intermittent pyonephros and ureter, stricture.	Recovered.	F.	Extraperitoneal; removed upper part ureter with kidney.
1892	Reynier	Secondary.	Descending tubercular ureteritis.	Recovered.	M.	April 27, 1892, exsection of kidney and part of ureter; June 29 and November 18, partial exsections of ureter, extraperitoneal.
Mar. 30, 1893	Kelly	Primary.	Tuberculosis of kidney and ureter.	Recovered.	F	Transperitoneal; removed all but lower half of pelvic portion of ureter; ovarian vessels ligated in abdomen.
Feb. 18, 1894	Postnikow	Primary.	Hydroureter and hydronephrosis.	Recovered.	M.	Extraperitoneal; removed thirteen stones and ureter to 2 cm. from bladder.
April 4, 1894	Schiller	Primary.	Tubercular kidney and ureter.	Recovered.	F.	Extraperitoneal; removed ureter to edge of pelvis and kidney.
July 6, 1895	Morris	Primary.	Tubercular ureter and kidney.	Died.	F.	Extraperitoneal.
Mar. 11, 1896	Morris	Secondary.	Tubercular ureter.	Recovered.	F.	Intracapsular nephrectomy February 8, 1896, then extraperitoneally ureter to broad ligament.
April, 1896	Elliot	Primary.	Tubercular ureter.	Recovered.	F.	Extraperitoneal; ureter removed to pelvic brim, stitched mucous membrane of end of stump.
July, 1897	Pouisson	Secondary.	Thick and hard ureter and pus.	Recovered.	F.	Nephrectomy three and a half months before; ureter removed to 3 or 4 cm. from bladder extraperitoneally.
Nov 19, 1898	Abbe	Primary.	Sarcoma of kidney.	Recovered.	F.	Four-pound tumor from a child eight months old and weighing fifteen pounds; removed ureter to near bladder; extraperitoneal.
Dec. 21, 1898	Sommers	Primary.	Traumatic hæmato-hydro-nephro-ureterosis.	Recovered.	F.	Distention of kidney and ureter by many quarts of dark colored watery fluid; ureter much thickened and distended.

BIBLIOGRAPHY.

1. Gigon. L'Union Médicale, February 14, 16, and 21, 1856.
2. Kelly, H. A. Johns Hopkins Hospital Bulletin, 1896-97, pp. 31-37.
3. Tuffier, Glantenay. Chirurgie de l'Uretère, These, Paris, 1895, p. 284.
4. Poncet, Liaudet. Total et partiel Uretèrectomie dans leçons des uretères avec ou sans operations renales 4, Lyon, 1894.
5. Gerster, A. G. Amer. Journ. Med. Sci., 1897, vol. cxiii. pp. 677-700.
6. Hartmann. Rev. de Chir., Paris, 1897, vol. xvii. p. 1046.

7. Morris, H. Lancet, London, 1898, vol. i. p. 17.
8. Reynier. Bull. et Mém. Soc. de Chir. de Paris, 1893, n. s., vol. xix. pp. 102–112.
9. Postnikow. Arch. f. klin. Chir., Berl., 1894–95, vol. xlix, pp. 675–687.
10. Pouisson. Assoc. franc. de Chir., Proc.-verb., etc., Paris, 1897, vol. xi. p. 385.
11. Elliot. Boston Med. and Surg. Journ., 1897, vol. cxxxvi. p. 173.
12. Bovée. Uretero-ureteral Anastomosis, Annals Surg., January, 1897, and a Contribution to Experimental Surgery of the Ureter, ibid., 1897, vol. xxvi. p. 314.
13. Tuffier et Dujarier. Rev. de Chir., April 10, 1898.
14. Morris, H. British Med. Journ., 1898, vol. i. p. 876.
15. Walker, George. Annals of Surgery, 1897, vol. xxvi. p. 555.
16. McCosh, A. J. Ibid., p. 364.
17. Abbe, R. Ibid., 1899. vol. xxx. pp. 317–320.
18. Schiller, Karl. Göteborg's Lakares Forhandlinger, 1893–95, pp. 110–112.
19. Sommers, John H., Jr. New York Medical Record, 1899, vol. lvi., pp. 166–167.
20. Fenger and Stanton. Diseases of the Ureter, in American Text-book of Genito-urinary Diseases, Syphilis, and Diseases of the Skin, 1898, p. 520.

DISCUSSION.

Dr. Samuel E. Milliken, of Dallas, Texas.—This subject is one of great interest, and I think it has been very well portrayed by the essayist. The only point I have to add is in the nature of a suggestion regarding the technique, which I saw carried out by Dr. Kelly, and that is, instead of making one incision, as I understood Dr. Bovée to do in the ureterectomy he performed, to leave a bridge of abdominal wall, making the first incision from the twelfth rib down to the crest of the ilium in front of the lumbar muscles, and then making a second incision along the inguinal region. This gives an opportunity to expose the kidney through the upper opening and to trace the ureter through the lower. It seems to me to be an excellent idea, and as it was not brought out in the paper, I merely wanted to call attention to it as a point in technique.

Dr. George H. Noble, of Atlanta, Ga.—The essayist should be congratulated upon his case, even though it was in the male and had a fatal termination. I understand it to be a secondary operation. Such operations upon the ureters are difficult, whether in the nature of excision, anastomosis, or implantation. This I am able to appreciate, having had some experience in that line of work. I hope it may be my good fortune to add another case to the list some time in the future. None of us would care to hunt for these cases, because the removal of the ureter is an operation of more or less magnitude, yet we should not shirk them. Unless there are reasons for removing it at the time the kidney is extirpated it should be left untouched. If we have a tuberculous

ureter it should be removed, even though it be done at considerable risk. If it is malignant it ought to have some consideration, especially if there is a reasonable hope of working clear of the field of the disease. Perhaps we are more justified in removing a tuberculous ureter than a malignant one, because we have better chances of obtaining successful results.

Dr. Bovée (closing the discussion).—I am glad that Dr. Milliken called my attention to a point in the technique which he saw Dr. Kelly carry out. There may be an advantage in two short incisions of having a less amount of tissue to cut across, such as muscles, fascia, etc., and two smaller wounds to heal instead of one large one. There is also a drawback in the matter of having to dissect through a smaller space to loosen the ureter between the two incisions. I believe such an operation would require more time, which, in many cases, is an important element. However, I have never seen it done that way, and I am not disposed to criticise the method at all.

MYOMA ORIGINATING IN THE MUSCULAR COAT OF THE EXTERNAL ILIAC VEIN.

By A. Morgan Cartledge, M.D.,
Louisville.

Myomatous tumors arising from the muscular coat of the veins constitute one of the rarest of pathological curiosities, as a faithful search of the literature discovers but two cases reported. There has evidently been some confusion in the minds of even pathologists as to the differentiation between tumors originating in the vessel-sheaths and neoplasms implicating the vessel-sheaths but originating external to these. It is not uncommon to find the carcinomata in their growth and development implicating the walls of bloodvessels, notably the veins, and occasionally destroying the sheath and penetrating into the lumen of the vessel.

According to Mosetig,[1] "Bloodvessels and their sheaths may be the seat of tumors in one of the three following ways: First, development within the vessel tube; second, development of foreign growths from the vessel-sheath; third, adhesion of tumors with bloodvessels and their sheaths. As to neoplasms affecting the vessel-sheath, only three varieties have been observed and described—viz.: atheromatous cysts, sarcomata, and epitheliomata."

These observations of Mosetig are based upon the report of a case of atheromatous cyst of the sheath of the carotid artery, and a case of melanotic sarcoma attached to the crural vein.

[1] Mosetig: Contribution to the Causes of Tumors of the Vessel-sheaths, Wiener medicinische Wochenschrift, 1866, xvi., 572, 589, 603.

Rokitansky[1] makes the following observations bearing upon new growths affecting the veins: "Adventitious structures. These formations are in general alike rare in the veins and the arteries, although cancerous disease of the veins presents an exception to the rule:

"1. A fibroid tissue occurs as an inflammatory product in thickening and sclerosis of the cellular coat of the vein. It is in a great measure the cause of the resemblance to the character of an artery exhibited by the diseased veins.

"2. An anomalous osseous substance, the so-called ossification of the veins. . . . This may be peripheral or central:

"(*a*) The peripheral includes the process of ossification that takes place in an excessive formation of the lining membrane of a vein. It appears in the form of plates, which, however, for obvious reasons, never attain the thickness of those which occur in the arteries. Its seat is in the venous wall. It is uncommon, and, except in extremely rare cases, very limited in extent. It commonly affects varicose veins, especially the saphena, and we occasionally observe it in the deep veins of the extremities, when they are in contact with ossified arteries, as in the internal spermatic vein in males or in the trunk of the portal vein or its splenic branches.

"(*b*) Central ossification includes two forms of concretions differing in their substrata—namely, phlebolites and the ossification of the coagulum closing an inflamed vein after its temporary metamorphosis into a fibroid string. Both lie in the canal of the vessel, either freely or coalescing with the wall of the vein.

"3. Tuberculosis does not accur either in or on the blood-vessels. . . .

"4. Cancer is no rare phenomenon in the veins. It occurs in two ways:

"(*a*) The walls of a vein are often perforated by an adjacent cancerous growth, the cancer attacks the tissue of the vein, like other tissues, and penetrates into the canal of the vessel. In

[1] C. Rokitansky: Abnormal Conditions of the Veins, Pathological Anatomy, iv., p. 358.

this way, large veins, as the trunk of the ascending vena cava, not infrequently become entirely closed by exuberant cancerous growths lying on the lumbar portion of the vertebral column.

"(*b*) A very rare form is the primary cancer. It occurs in a vein, generally a large one, as a broad or narrow, pedicled, roundish, pear-like, single or lobular, adventitious mass, or as a cylindrical mass adhering to the whole or greater portion of the circumference, and closing the vein. It is sometimes attached loosely to the lining membrane by means of a gelatinous blastema, or its parenchyma penetrates into the tissue of the venous wall to various depths. According to circumstances, of which the most important is the duration of the existence of the adventitious product, it presents the appearance either of a fibrinous coagulum or of an aggregation of primary cells in various stages of development, the whole mass commonly presenting the characters of medullary cancer. This form of cancer never occurs except in association with a large exuberant cancerous growth in some other organ, or where there is a widely diffused and rapid formation of cancerous tumors in many organs, especially of intense medullary cancer (encephaloid). It scarcely ever occurs in the organism, except as a secondary formation. The lymphatics in the vicinity are very often plugged and closed by the medullary cancer. . . .

"This cancer of the veins doubtless occurs through the absorption of cancerous matter by the lymphatics and veins into the mass of the blood, and, independently of the latter, it may be of spontaneous origin, and may be the result and expression of the highest degree of endogenous disease of the fibrin. . . . "

The above quotations have no special bearing upon our subject except as indicating the absence of any knowledge of venous myomata. The only reference to the subject of myomata of the veins is that found in most works on surgical pathology to the two cases reported respectively by Aufrecht and Boettcher. A remarkable coincidence is that these cases were observed and recorded in consecutive years, that of Aufrecht in 1868 and that of Boettcher in 1869. The rarity of the

disease and the few cases recorded warrant us in briefly quoting them as presented by their authors.

Aufrecht[1] reports the case of a soldier aged twenty-three years, who at nine years noticed a growth the size of a bean situated at the right and inner side of the tibia, lately steadily increasing in size, but causing no pain. The growth was covered by normal skin, situated on a level with the internal malleolus, between this and the tendon of the tibialis anticus. It is very hard, movable in all directions, more so anteriorly and posteriorly. On moving the tumor from above downward, a string 3.4 cm. x 6.8 cm. could be distinctly felt, and the possibility of its connection with the saphenous vein was thought of. On operation the tumor could not be detached from this string, and though the other portion of the tumor was easily enucleated, it was necessary to cut through the vessel. A stream of venous blood issued from both cut ends, which was controlled by compression. Recovery.

The extirpated tumor measures 2.5 cm. x 1.5 cm., contained a small cavity filled with blood, which was traversed by the saphenous vein, and through which a small sound could be passed.

Microscopically the outer layer consists of fine fibrillæ and elastic fibres traversed by connective tissue. Beneath this the characteristic arrangement of myoma. From the outer layer of connective tissue to the innermost layer of elastic tissue there is a sheath of smooth muscle fibres, showing a homologous new-growth originating in the media of the vein.

Boettcher[2] reports the following case: A female, aged thirty years, had a tumor one inch above the wrist-joint, at the flexor surface in the neighborhood of the ulnar margin. The growth is hard, sharply defined and causes severe pains in the little and ring fingers. As its situation corresponded to the course of the ulnar nerve it was thought to be a neuroma. Its

[1] E. Aufrecht: Myoma of the Saphenous Vein, Archiv. für Pathologische Anatomie, etc., Berlin, 1868, xliv., p. 133.

[2] Prof. Arthur Boettcher: Myoma of the Ulnar Vein, Archiv. für Patholog. Anatomie, etc., Berlin, 1869, xlvii., p. 372.

removal was not difficult, but attended by severe venous hemorrhage, controlled by compression. Recovery was rapid, but paralysis of the fourth and fifth fingers persisted, probably due to the removal of a piece of the ulnar nerve along with the tumor.

The growth was of the size of a filbert and of a firm consistence. The vein passed directly through a cross-section and shows the three layers of the vessel quite distinctly, the muscular coat being 1.30 mm. thick. The growth consists of muscular fibres held together by connective tissues. The cells are partly spindle-shaped, partly forked at their extremities, with longer and shorter processes. The nucleus is very distinct in some of the cells, in others it is only recognizable as a nodular swelling.

The writer also found two nuclei in one cell, surrounded by a finely nucleated mass, sharply differentiated from the other, yellowish, shining and contractile substance.

My own case occurred in a woman aged fifty-three years, who presented for consultation in the early part of March, 1899, with the following history: Five years ago the patient suffered from swelling of the left limb, extending from foot to hip; it came on gradually and the limb attained a considerable size; the swelling subsided in eight or ten months. She had pain at this time in the left iliac region low down. No enlargement was noticed. Two years ago the patient noticed a small lump just above Poupart's ligament on the left side, from which she suffered some pain. Within the last year pain has been much greater in the left iliac region, enlargement more distinct and very hard; latterly she has been losing much flesh; has slept poorly on account of pain, and has also suffered from accumulations of gas in the bowels. Tympany has been troublesome and she has been constantly annoyed by eructations of gas from the stomach. She passed the menopause at the forty-eighth year.

Present Condition. She is moderately well nourished; somewhat anæmic; pulse quick, 110, not very strong. On the left side, just above Poupart's ligament, corresponding to about the

course of the inguinal canal, but upon a deeper plane, there is an irregular, hard, nodular mass about the size of a goose egg, movable and dipping deep behind the pubic ramus; palpation causes some pain. A vaginal examination shows a fibroid uterus about the size of a fist, showing multiple fibroid tumors which appear to be subperitoneal and apparently in retrogression through processes incident to the menopause.

Diagnosis. Carcinoma of the deep inguinal glands above Poupart's ligament, probably due to some primary yet undiscoverable carcinomatous lesion in the bowel or uterus. Exploration of the iliac tumor was advised for a more positive diagnosis, and removal if found expedient. This was accepted and the operation performed on March 9, 1899.

Operation. Incision beginning near the external abdominal ring, and running one inch above and parallel with Poupart's ligament, five inches in length, came in contact with the tumor after opening the fascia of the external oblique muscle. The anterior part of the tumor occupied the inguinal canal; the round ligament was easily identified in front of the tumor, occupying the most fantastic relation to it, wound as it was in and out around several lobules of the tumor; it was separated easily and pushed to the inner side. It was now seen that the tumor was not of glandular origin. By blunt dissection it was gradually freed from its upper and lower and internal bed. The outer and deeper attachments were approached with great concern, as they were evidently in the closest relation with the external iliac vessels. Up to this time no vessels of importance had been encountered. It had been expected to run across the deep epigastric, but it nowhere appeared. Gentle and careful blunt dissection carried the pelvic peritoneum upward, no buttonholing of the same occurring. After reaching the base and upper and outer part of the growth, the external iliac artery could be plainly felt entering the tumor. Search to the inner and posterior aspect of the artery failed to demonstrate definitely the vein; nothing more than a fibrous thickening could be made out, which was lost in the tumor substance. The point at which the external iliac artery entered the growth

was about two inches above its lower termination. The apparent obliteration of the vein and its elimination as a factor in any surgical procedure affecting the circulation of the limb, determined us to ligate the artery one-half an inch above where it entered the growth. The fibrous remains representing the vein were similarly treated. The tumor was now separated from above downward, the deepest projection being disembedded from the obturator foramen; it now remained only attached to the vein and artery beneath Poupart's ligament. These were freed from the surrounding structures by blunt dissection, and were ligated separately and the tumor removed. In cutting the vein below where it entered the growth it was manifest that its lumen was almost obliterated, barely admitting a good-sized needle. The tumor was removed entire, with not a lobule broken, and passing through it and removed with it, was one and three-quarter inches of the external iliac artery and the same length of the nearly obliterated vein. The only hemorrhage of any account was from the obturator vein where it passes through the foramen; this was easily secured by ligation. The vessel was much enlarged, no doubt as a result of participating in a long since established collateral venous circulation. The upper portion of the incision was closed by tier sutures, the lower portion being left open and being occupied by a gauze drain which was placed down to the obturator foramen.

The left limb was enveloped in a heavy pad of cotton held in place by a bandage, and hot bottles were kept applied along the limb.

March 17, 1899. Some pain was complained of along the whole length of the limb, but there has been at no time any marked modification of sensation in the limb; some pain was also complained of along the incision, but at no time has there been any swelling of the limb. On about March 15th there was some induration at the centre of the incision, and fluctuation appeared at this point to-day (17th). Incision gave outlet to about one-half an ounce of pus which had a decidedly fecal odor.

March 27. There still continued a small discharge of pus from the middle of the incision, which, however, has lost its fecal odor.

The patient's bowels have been moved at intervals of two or three days by means of cathartics and high enemata. There has been constantly considerable distention of the abdomen from gas, with almost constant eructations of same from the stomach. This has caused great discomfort, but has been much less marked in the last four or five days.

For a number of days alimentation was entirely by nutritive enemata with the object of limiting the accumulation of gas.

Macroscopically the tumor is multinodular, very dense and hard, in consistence very like the fibroid tumors of the uterus. It is irregularly round, measuring 17 centimetres in circumference. Beneath Poupart's ligament both artery and vein can be seen entering the tumor, the vein being almost closed by fibrous thickening within its lumen. The artery is enclosed by two lobules of the tumor having grown around it and meeting but not joining beneath it. On separating these two lobules and incising the artery its walls are found to be intact and its lumen entirely pervious.

The vein beneath Poupart's ligament, as already mentioned, is almost occluded, its lumen giving passage only to an ordinary needle. Its walls are seen to be dilated and about one inch above Poupart's ligament they became lost in the ramification of the tumor so that proximally, while the artery was distinct and was tied off before being severed, the vein was impossible of recognition and tissue was simply tied across at the point where it was believed the vein should be. On incising the wall of the vein a lobule of the tumor is found to occupy the interior of the vein; this lobule measures 2.5 centimetres in length by 1.5 centimetres in thickness. It is free below, but above it is attached to and continuous with the vein wall and a lobule of the tumor without the vein. While there is some fibrous tissue in the tumor, as is nearly always found in the fibroid tumors of the uterus, the prevailing elements are

the non-striated cells, the structure, therefore, being typically leiomyomatous.

Dr. Senn, being in Louisville on March 17th, examined this tumor and its microscopical section, and agreed with the reporters as to its nature and origin.

June 15, 1899. The patient reports to-day in the office; is looking and feeling well; strength and appetite good. There is some swelling of the left leg and foot after standing all day. This disappears almost entirely at night. She is inclined still to constipation; still has cramps in the region o the stomach, associated with eructations of gas which affords some relief. Bowels move only in response to laxatives. Left leg and foot feel heavy and interfere with rapid locomotion.

DISCUSSION.

Dr. William E. Parker, of New Orleans, La.—I do not think there is much to be said on the interesting case reported by Dr. Cartledge. As to the diagnosis, it is very difficult to diagnosticate tumors below the groin. The paper is interesting, as well as the case, on account of the nature of the tumor. The tumor was gradually growing, and had the doctor taken out a section or sections of the vein when the collateral circulation was not very well established, the patient would have had serious trouble with the leg.

TREATMENT OF GUNSHOT WOUNDS OF THE ABDOMEN, WITH SOME NEW STATISTICS.

By H. H. Grant, M.D.,
Louisville, Ky.

The surgery of gunshot wounds of the abdomen, which has been for some years pretty well settled to the satisfaction of the profession, received something of a shock by the report of the surgeons who served in the late war with Spain (*vide Journal of the American Medical Association*, July 9, 1898, and published report of the last meeting of this body). Though these reports, which were made by men of experience and high reputation on the subject, were modified to bear especially on the wounds received in battle, yet the inferences, and indeed the conclusions, affect to a considerable degree surgical judgment. It was because the settled data of private surgery was so much at variance with these reports that I deemed it justifiable to inquire a little further into the subject. The result of the investigation by Klemm shows in an analysis of 152 cases that even those in whom penetrating wounds in the abdomen were established who did not die of immediate effects, eventually nearly all succumbed to exhaustion from sepsis and later suppuration. The meaning of this is that, practically speaking, all penetrating gunshot wounds of the abdomen untreated by surgical repair of the lesion die either of hemorrhage, peritonitis or sepsis. It is not to be denied that a small bullet, in certain situations, pursuing an unexpectedly favorable course, may occasionally fail to produce a fatal injury, but it will be seen from the statistics I have reported, as well as those of Klemm, that such favorable results did present in only about 6 per cent. of over 400 cases. The complete analysis of the

subject, made by Dr. W. E. Parker, settled by the comparison of the reports of a large number of reliable operators the following points :

The mortality after operations done in the first seven hours after injury is 52 per cent., as against 64 per cent. for operations at all periods. But a study of the table of Parker shows such variations in the mortality succeeding complicated and uncomplicated wounds of the various viscera, all of fatal character without operation, as to indicate that, in uncomplicated wounds in some situations, the early operator will save often 75 to 80 per cent. of what would otherwise be fatal cases.

His table also shows that of sixteen operations done in which no intraperitoneal injury was found but three died, one from an overlooked perforation, and two from peritonitis due to infected blood clot (the fatal complication upon which Klemm lays so much stress). Thus we see that no death was referable to the operation even as a contributing cause. It also appears that in considerably over a hundred cases (the exact number is hard to get at in the table, as in the classification it was necessary to duplicate often) there was no reported recovery from operation done twenty-four hours after injury.

There is still one other important deduction from this invaluable paper, supplemented as it is by many other sources of testimony : Almost all operators agree that there is no reliable symptom of perforation or mortal lesion in the operable hours after injury. It will be interesting to review these facts in connection with the study of the reports I shall present a little later. Notwithstanding these reports, and others of an equally convincing nature, it is still published in our current medical literature, and still finds a place in valuable text-books on surgery, that a considerable percentage of untreated gunshot wounds of the abdomen will recover, and that treatment by operation may be deferred until symptoms indicate perforation. Confronted by this state of things, I decided to send out the following circular to over a hundred prominent surgeons of this country :

1. In what proportion of operations, after tracing the ball into the abdominal cavity, have you failed to find perforations of the hollow viscera or dangerous wounds of the solid viscera?

2. In what proportion of fatal operations have you found, post mortem, evidence of unsecured perforations or unchecked hemorrhage?

3. In what proportions of both fatal and recovered cases was there evidence of peritonitis at the operation?

Recovered.

Fatal.

4. How often have you had reason to believe after laparotomy on a *traced wound* the chances of life were lessened by operation?

5. Recoveries.

6. Deaths.

I have received in reply reports of 253 operated cases. I have preserved the original reports, which are at the service of any investigator, but no table of names and cases will be published in full. I have to thank for the courtesy of response the following gentlemen: Drs. W. L. Robinson, W. O. Roberts, J. B. Bullitt, C. A. Wheaton, J. Ransohof, T. J. Crofford, James Dunn, L. M. Tiffany, E. Laplace, A. T. Bristow, R. Douglas, H. H. Mudd, W. E. Parker, Joseph Geiger, F. McRae, W. E. B. Davis, J. D. S. Davis, A. M. Vance, George Crile, J. B. Murphy, C. A. Powers, D. Barrow, L. Freeman, L. P. Nolte, A. J. Ochsner, H. B. Delatour, J. G. Sherrill, F. Samuel, M. H. Richardson, R. E. Fort, W. L. Rodman, H. M. Taylor, P. S. Connor, B. M. Ricketts, C. C. Commegys, W. Potter, J. Y. Brown, A. Cordier.

I have in no case made use of any other report than the direct answer. I have not endeavored to compare the mortality with reference to the organs injured nor to the time of operation, not alone because both of these points are covered by the tables of Parker and Coley, but particularly because I wished to determine the propriety of exploration in all

cases of penetrating wounds prior to the development of general peritonitis. The great majority of these cases are not included in any published tables, and many of them are accompanied by notes indicating that the operation was made early. An analysis of the reports develops a number of most important and interesting facts. The mortality in the whole number is about 52 per cent.—the best results reported in any published table—an indication that the prognosis is improving with the more energetic measures of treatment. In 21 of the 253 operations neither perforation nor serious hemorrhage was found. It is to be doubted whether so large a number of *traced* penetrating bullets could fail of more serious injury, and there is a presumption of faulty diagnosis in some of them. However, they all recovered, so the operation did no harm. In 28 of the 133 fatal cases there was found, post mortem, the evidence of faulty surgery in the presence of unsecured perforations or hemorrhage. If we omit the 21 non-perforated and the 28 unsecured, the mortality is 51 per cent. of the whole number. Of the recovering cases 11 are reported to have had notable peritonitis at the operation; some 6 or 8 others report traces. This may be taken to indicate that about 5 per cent. of cases with severe peritonitis may be expected to recover after laparotomy. In answer to question 4, three surgeons confess to have done harm by the operation. Each of these was a man of experience. One thinks the operation hastened death by shock, as the source of hemorrhage was not discovered. As this case must have died anyway, it is not a figure in the calculation.

The second states that though the section disclosed a perforating wound of both walls of the stomach there was no extravasation until the organ was pulled forward at the operation. Though this conclusion be correct, no surgeon would hesitate to do a section when he knew a perforating wound of the stomach existed. It is such wounds that Klemm declares death follows from sepsis and abscess in those who survive the immediate injury. The explanation of the third exception is practically the same. Thus the surgical conclusion is fairly

that in no case was the result affected unfavorably by the operation.

The following table, made up of the most favorable reports, by surgeons too well known to be misunderstood about statistics, shows what may be accomplished in a considerable number of cases in good hands. Only those in which a lesion was found are included in this table:

Name.	Recovered.	Died.
Tiffany	3	4
McRae	2	1
Mayo	3	0
Ochsner	3	1
Douglas	4	1
Geiger	8	2
Dunn	2	1
Rodman	3	3
Delatour	3	2
Richardson	1	1
Nolte	9	6
Laplace	13	7
Parker	5	7
Vance	3	4
Grant	4	1

The result is 67 recoveries and 41 deaths, giving a percentage of recovery in unselected cases, without regard to time of operation or to organ injured, of over 61 per cent. Better than the strangulated hernia gave fifty years ago. At the last meeting of the Association I reported four cases, with three recoveries—two after resection of the intestine. Since then I have operated on but one case—a negro man, seen fourteen hours after injury. Three perforations of the ileum were found, one evidently being made by the penetration of a knuckle of a bent intestine; intense abdominal distention, with pain, set up on the second day—pulse 130, temperature 106°. The bowels, however, responded to salines, and he had twenty-seven movements in twenty-four hours. The purgation was kept up, the distention passed away, and he recovered without further accident.

I shall not trouble you with further reflections. It is im-

possible to review the combined statistics without concluding upon pre-emptory instruction. The reports of experienced and favorably situated individual surgeons are even more mandatory. These cases demand prompt exploratory surgery—the simplest and least burdening in responsibility required in the abdomen. And how widely extended is the field! If you will but think, you will remember that as often as at least once a week the daily newspapers of every large city will chronicle an abdominal gunshot within the reach in abundant time of some local surgeon. This is true all over the Southern and Western country. Very few, indeed, of these are ever seen by surgeons. Why not? Because we have not educated the physician to appreciate the folly and fatality of delay and the hopefulness of prompt and efficient aid. True it is that while most of us are agreed in the main that operation is indicated in gunshot wound of the abdomen, that delayed cases give bad returns, the exact statistics are not made clear to the general practitioner. Every man who deserves the name of physician now knows that a strangulated hernia cannot get well without operation, that long taxis is dangerous, and delay little less than fatal. All these cases in anything like intelligent hands are hurried to the surgeon. But it is only a few years since text-books of surgery advised opium, elevation of hips, hot applications, and delay for hours, even days, to see if the condition could not be relieved without surgery. Then, when too late for success, a division of the stricture without opening the sac, which cannot half the time hope to relieve the constriction. The mortality after an operation, which if done in our time, in season, under proper surroundings, is less than 1 per cent., was put down by Gross in 1850 at nearly 50 per cent. Not less clear are the indications for operations in a traced gunshot wound of the abdomen. But here time is far more precious than in hernia, and the need for absolute and uniform instruction is imperative. There is some excuse for our wavering and inconsistent views on appendicitis; its mild prognosis when untreated by surgery, its masked pathology, and the history of frequent recovery after desperate symptoms, natu-

rally admit of difference in surgical judgment; but in the lesion under consideration there is no double ground. Exploration is the only means of accurate diagnosis, and death is practically certain in untreated penetrating wounds after twenty-four-hours' delay. How much this means to the prolongation of life cannot be determined until these conclusions become surgical principles and are inculcated into the mind of every practising physician in our Western and Southern country. As to the duty of the surgeon, I add here, as I declared in the paper read before this Association at Memphis: "With these facts before us it is clear that to delay in a delusive hope, until peritonitis shows its folly, is almost a crime. The practical management of a suspected penetrating wound is as plain duty as the tying of a bleeding artery. As soon as possible after injury the patient is to be transported to a suitable place and under usual precautions; after all preparations are made for laparotomy and repair of lesions an experienced hand should carefully trace the course of the ball into the cavity, if it goes there. This is easy enough when the penetration is direct from the abdominal wall, but often difficult or impossible when from behind or from the thoracic or pelvic cavities. Under these latter circumstances the history of the direction of the projectile and the general symptoms must be the only guide, giving to the side of operation the benefit of the doubt."

DISCUSSION.

Dr. Hugh M. Taylor, of Richmond, Virginia.—I have listened to the paper of Dr. Grant with a great deal of interest, and I agree with one of his last conclusions—namely, that it is the duty of this Association to educate the public as to what course should be pursued in gunshot wounds of the abdomen. Probably some of you may not have had the same difficulty to contend with that I have had in the matter of emphasizing the utter hopelessness of these cases until an operation is performed. Other arguments by men whose opinions are entitled to respect are brought forward, but it is not an easy matter always to satisfy

the attending physician that in the absence of serious symptoms an exploratory incision is imperative. I agree with the author of the paper fully that there is one resource to pursue, and I have pursued that plan in four cases within the last two years, and I am glad to say I have saved one of them.

Dr. William E. Parker, of New Orleans, Louisiana.—I am glad to see, from the table of statistics that Dr. Grant has drawn up, that the percentage of recoveries is improving. I have not operated on a case of gunshot wound of the abdomen for about three years. In the cases previously operated upon by me I did not have as large a percentage of recoveries as the doctor's table shows.

With reference to gunshot wounds of the belly that are not operated upon and the patients not getting well, although I am a strong advocate of early operation in these cases in civil life, I believe that a great many men who do considerable hospital work have had a chance to see some of the cases get well that were unoperated. I recall at this time a patient who had received a gunshot wound of the abdomen when I was a medical student, at which time surgeons were not opening the abdomen for gunshot wounds. Dr. Miles sent this man to a ward in the Charity Hospital, and he recovered without operation. Some three or four years afterward he was again shot in the belly; Dr. Miles opened his abdomen and closed fourteen perforations after the man had been carried in a wagon several miles to the hospital. He recovered. I know of two or three cases of gunshot wounds of the abdomen that were at the Charity Hospital within the last year and a half, and for some good reasons the surgeons in charge did not deem it advisable to operate on them, and the patients got well. Dr. Bloom will bear me out in that statement. I believe that the percentage of recoveries after operation is very much greater than that without operation.

As to the military aspect of gunshot wounds of the abdomen, there is not a great deal to be said. Last year, in this Association, I took the ground that with the modern small calibre bullet as many of these cases would get well in the field without operation as with it. Dr. Grant went for me a little after making this statement, but I believe we are of the same opinion still.

It is the duty of an Association like this to bring this matter before the general practitioner, and prove to him, which we can

do, that the thing to do in these cases where the wounds are received in civil life is to operate on them early. We should try to show them that the longer the delay the greater the mortality.

Dr. Manning Simons, of Charleston, South Carolina.—I am very glad to hear the remarks of Dr. Parker on the mortality of gunshot wounds of the abdomen that are operated upon and those that are not operated upon, because his reputation in this direction is well-known to the Fellows of the Association, and his thoughts are practical and valuable. I have had occasion to operate on twenty cases of gunshot wounds of the belly, resorting, of course, to laparotomy, and I have become very much disheartened with operative measures for gunshot wounds. I have had, I suppose, tolerably fair success, considering the class of cases that have come under my care. Out of these twenty laparotomies for gunshot wounds of the abdomen I have saved three. One of these was a case of gunshot wound of the stomach which I fortunately saw a few hours after its occurrence. After opening the abdomen I sewed up two perforations of the stomach, one of entrance and one of exit, the ball being lodged in the muscles of the back. This patient, a boy, recovered. He had no nourishment or water by the mouth for nine days; he was nourished entirely by the rectum, and all fluid he had was given per rectum. He is well to-day. I have had one case in which I sewed up as many as fifteen perforations of the intestine. In other cases I have resected as much as two feet of the small intestine. Many cases were brought to me from the country; some of the patients had travelled by railroad, while others came in vehicles. They came under my care too late to do much good. Dr. Parker tells us that those cases that are operated on in the first seven hours offer the best prospects for recovery. In a number of cases upon which I had operated there was beginning peritonitis; others had extravasation of fecal matter into the peritoneal cavity. In the cases of resection the intestine was joined together by the Murphy button. I found that after forty-eight hours from the time of operation, or from the time the anastomosis had been completed, the peritoneal surfaces had thoroughly united, the intestines would hold water. Even in those cases where the operation had been done carefully, so that the resections were followed by no escape of fluid, the patients died within forty-eight hours of acute septic peritonitis, in spite of the most careful technique that was

carried out. I have been watching with interest the results of these operations in our late war with Spain, because the surgeons must have encountered very many penetrating gunshot wounds of the abdomen at Santiago and in the Philippines.

Dr. Samuel E. Milliken, of Dallas, Texas.—Down in our part of the country there is very little need for a doctor after a man has received a gunshot wound, as they usually call for an undertaker. However, I believe the position of Dr. Simons is fairly illustrative of our abdominal surgery, especially with the negroes. I have had in the past three years one case of gunshot wound of the abdomen. A child, seven years of age, had received the contents of a shotgun (buckshot, I believe) in the left side of the abdomen; the tissues were considerably lacerated, and when I saw the child, three days after, there was fecal extravasation. The patient was in poor condition, although I decided to do a laparotomy and to investigate as to any further injuries that may have been received. I made a median laparotomy, and, on investigation, found the descending colon adherent; I simply closed the fecal fistula in the descending colon, which resulted in good union, although the external wound healed by granulation. In spite of the fact that the patient was put on a restricted fluid diet, on the fourth day after the operation the child was given a pound of candy or more, which it ate without any ill effects.

Dr. F. W. Parham, of New Orleans, La.—I wish to call attention to one point which has not been touched upon, and which seems of especial importance, and that is a study of the wound itself in assisting us in determining whether the bullet has penetrated or not and the probability of visceral injury. In a case of wound of the shoulder, from an examination of the wound it was quite easy to tell the direction of the ball. If the bullet strikes the surface at a right angle, the whole margin of the wound is uniform in character. If it strikes at an angle, there would be a bevel at the side first struck. It seems to me we are gradually coming to believe that every wound of the abdomen which can be demonstrated to be penetrating must be operated upon. I believe this will be the ultimate result of our further experience. We ought to adopt every possible precaution in determining whether the cases belong to the class which can be safely left alone or to the class which certainly will die.

Of course, this is a difficult matter, but the character of the wound itself, showing direction of ball, its location, and all the circumstances connected with the shooting, as to distance of combatants, etc., should have due consideration in arriving at a conclusion.

Dr. J. D. Bloom, of New Orleans, La.—Dr. Parham is very kind in asking me to say something on the subject of gunshot wounds of the abdomen. There can be no doubt but that many of these cases get well without operation, and I believe the location of the wound of the abdomen has a great deal to do with the many that recover without operative interference. In our experience at the Charity Hospital we find that patients with wounds in the upper regions of the abdomen get well without operation—that is, those wounds in which there is no evidence of stomach injury. A wound of the liver, a wound of the spleen, and wounds, from the history of which we gain an idea of the bullet passing in direct line, eliminating the possibility of injury to the hollow viscera, such cases we usually treat on the conservative plan, and the majority of them, I can safely say, get well. I agree with Dr. Parker that in those cases in which operative assistance is entertained, if operated on within six or eight hours after the injury, usually do much better than cases of greater delay. The diagnosis of penetration is the essential factor in determining upon an operation.

I recall a case in which the patient was brought to the Charity Hospital suffering with a gunshot wound of the abdomen. It was accepted as a fact that the wound had penetrated the peritoneal cavity. An operation was done and non-penetration found. There was no peritoneal or intestinal injury. This case emphasized the necessity of careful investigation and careful exploration of a wound before contemplating more active operative procedure. It is very essential to the protection of the patient.

While the majority of cases that get well do so when operated upon within the first eight hours, I recall several cases in which operation was done twenty-four and thirty-six hours after the reception of the wound, the patients making excellent recoveries. Of course, there is a greater liability to extensive peritonitis, and, in fact, in all of the cases some peritonitis existed. I recall a case in point, that of a guard who wandered away from his post and was shot by a fellow-guard. This was about two years ago.

He was brought to the Charity Hospital thirty-six hours after the injury, and, on opening the abdomen, we found six or eight perforations of the intestine. He made an excellent recovery, although peritonitis existed at the time of the operation. Shortly after his recovery he suffered with intestinal obstruction, necessitating a second operation. At this operation we found bands of adhesions and agglutination of the intestines which required liberation, and from which he never recovered.

I agree with Dr. Simons that in many cases presented to us our results following operations are disappointing. For a time we find cases in which operative results are very encouraging. Then, again, for some reason or other, which we cannot explain, the mortality following operative interference is very large and out of all proportion to our previous experience.

Dr. W. E. B. Davis, of Birmingham, Ala.—Dr. Parham struck the keynote when he said that the question we want to settle is whether every case must be operated on when the abdomen has been penetrated. It is necessary, as he has stated, to examine the wound of entrance so as to determine positively that the abdomen has been entered. The teaching of Senn has done a great deal of harm by creating a sentiment that makes it hard for surgeons to operate in certain communities. If the patient should die the surgeon would be held responsible rather than the nature of the wound. The gas-test of Senn, which is still used by some, should never be resorted to unless used to find a wound after the abdomen has been opened.

It will not do to wait for the symptoms before proceeding to operate. If we wait for the manifestation of symptoms it means general peritonitis and death. There is a very important class of cases where the patients have rapid pulse and all the evidences of hemorrhage. These cases are unfavorable for operation, even though operated upon within the first twelve hours. In such cases the abdomen should be opened rapidly and the abdominal aorta compressed high up to control the hemorrhage. We have had quite a number of cases of gunshot wounds in the abdomen in the Birmingham district during the past twelve years. My brother and I have operated on at least twenty cases more than twenty-four hours after the injury. I only recall one case that was saved, and in this there was no injury of the intestines.

It is very interesting to study this subject as it has been pre-

sented to this Association. At the Charleston meeting it came up for discussion, and the consensus of opinion was that all cases should be operated on, and that good results were to be obtained from operative measures in late cases. At that time, basing my opinion upon considerable experimental work, I took the position that if we operated on cases twenty-four hours after the receipt of the wound the patients would die as a rule. Dr. Parker, Dr. Joseph Price and others took the opposite view, claiming that by operating on these cases there was a fairly good chance of saving them. Dr. Parker was then requested to read a paper on the subject at the next meeting of the Association, in Nashville, and at that meeting he indorsed the position that operating on these cases after twenty-four hours usually meant death. At that time a resolution was adopted by the Association which was to the effect that in every case in which the abdomen had been penetrated an operation should be done. At the Memphis meeting Dr. Parker still held that an operation should be done in civil, but not in military practice. I do not think the abdomen should be opened in a case of gunshot wound on the battlefield if the surgeon has not suitable environments. Such operations would be attended with more danger than letting the patients alone. In the future the army should make suitable arrangements for undertaking these operations. It is a reflection on our military service not to give these cases the benefit of operation.

Dr. F. W. McRae, of Atlanta, Ga.—The experience which I have had with gunshot wounds of the abdomen is the very opposite of the conclusions which have been reached by some observers. There have been at the Grady Hospital five cases of gunshot wounds of the abdomen where the point of entrance of the bullet was above the umbilicus, the injury having been received in the standing posture, and in every case there were numerous perforations of the hollow viscera. Every patient was laparotomized. I saw one case in which the injury was received directly from in front; I mentioned it at the Memphis meeting. The point of entrance of the bullet was over the fifth rib. I was telephoned for, and instructed the house surgeon to let the patient rest for a while, that the bullet had probably gone through the chest. The patient had not had many symptoms, and I thought an operation would do little good. Inside of an hour the patient vomited the bullet. I then operated on him

and found three holes in the stomach. The bullet had ranged deep under the ribs, entered the stomach, passed through a fold and back into the cavity. Extravasation of stomach contents into the peritoneal cavity. The man recovered.

One of the principal reasons why in military practice we get better results than in civil practice from gunshot wounds of the abdomen is because of the fact that, as a rule, in military practice wounds are received by individuals who have fasted for a number of hours and the intestines are empty; extravasation is not so likely to take place in such cases. On the other hand, in civil practice wounds of the abdomen are usually received under conditions of more or less debauchery, when the stomach is filled with whiskey, beer, limburger, etc., and extravasation takes place rapidly. Death is much more apt to occur in these cases. It seems to me the statistics which Dr. Grant has presented argue in favor of tracing these wounds in every instance. If I understood him correctly, in more than twenty of the cases no injury was found of the intestine, still the patients were not injured in any way by tracing the course of the missile. These statistics demonstrate, furthermore, that in a certain proportion of the cases no injury to the hollow viscera is found. In twenty-eight cases unclosed perforations were found to exist post-mortem. We cannot charge the deaths in these cases to the operation at all, but simply to the lack of doing what the operation was undertaken to do. Of two hundred and fifty odd cases, in less than 10 per cent. there was no injury. Experiments made upon dogs and the lower animals show that in 90 per cent. of the cases in which intentional penetrating wounds of the abdomen were made the hollow viscera are injured, or there was serious injury to the solid viscera. Every case where it is apparently a penetrating wound, under favorable conditions it should be traced.

As to the gas-test of Senn, it is worse than useless; it is dangerous. It is only corroborative; it is not conclusive as to non-penetration. It simply corroborates the first fact that we have penetration where penetration exists, and it greatly enhances the difficulty of a subsequent operation and increases the danger to the patient because it produces extravasation of the contents of alimentary canal into the peritoneal cavity.

Dr. Grant (closing the discussion).—I thank the Association for its liberal discussion of my paper, and, although the ground

has been well covered in the discussion, I regret that my voice will not permit me to emphasize the point that the treatment of penetration demands an exploratory operation. Granted that in some cases in which the gut is perforated the patients will get well by the efforts of nature, it is indisputable that over 90 per cent. of such cases will die, and most of those not so perishing will require a later dangerous and difficult operation for fecal fistula or abscess. Granted that ten in one hundred of penetrating bullets will not make a fatal lesion, it is proved that of the one hundred laparotomies done in order to save the other ninety, no case of death will result from exploration. Realizing that the diagnosis of an internal lesion is never made until the exploration, nothing is left but to teach it to be the duty of all having care of suspected cases to get the most experienced help obtainable on short notice, and in fairly favorable surroundings investigate by operation.

THE HISTORY AND METHODS OF INTRALARYNGEAL INSUFFLATION FOR THE RELIEF OF ACUTE SURGICAL PNEUMOTHORAX, WITH A DESCRIPTION OF THE LATEST DEVICES FOR THE PURPOSE.

By Rudolph Matas, M.D.,
New Orleans, La.

---

1. In man, as in the lower animals, the sudden admission of air in the normal pleura, whether this occurs accidentally or as the result of deliberate purpose in the course of operative interventions in the thorax, is a condition always fraught with much danger to the patient and anxiety to the operator.

2. It is not a small accidental puncture or aperture communicating with the pleural cavity, permitting the gradual entrance of air and the production of a partial pneumothorax, that is feared, but is the large openings which allow the rapid and free entrance of air, and that are followed almost invariably by collapse of the lungs, cyanosis and evidences of defective oxygenation and arrested respiration, that have led the surgeons of all times to dread the production of traumatism or surgical pneumothorax as one of the greatest evils in intrathoracic surgery.

3. The evidence on this subject is so complete that it is almost superfluous to discuss it. Nothing can be added to the experimental evidence which, beginning with the classical researches of Glück, Block, Marcus, Schmidt and Biondi in the early eighties, ended with Murphy's work in 1897, or to the clinical observations commencing with Richerand's historic

case of resection of a thoraco-parietal tumor in 1818, have accumulated in such numbers that a mere list of the contributions referring to this grave accident would make up a large-sized volume.

4. It was the fear of pulmonary collapse that led Dieffenbach, with all his temerity and daring, to command that in operating on thoraco-parietal neoplasms the surgeon "should halt at the pleura," and Stromeyer, Albert, Heinecke, and Bardeleben were scarcely less emphatic. Roser recommended long meditation before undertaking the removal of any tumor of the chest that might involve the pleural serosa. Billroth himself, in 1887, declared for the same reason that he was not in favor of the extirpation of tumors involving the thoracic parietes. Subsequent events have shown that while great progress has been accomplished by a better appreciation and control of septic conditions and the improvements in the technique of anæsthesia and hæmostasis, and better results have been obtained for this reason alone, the dangers from pneumothorax have remained until quite recently an unchanged factor in the mortality.

5. (*a*) Whatever the essential causes of the asphyxia caused by acute traumatic pneumothorax, they are always associated with the sudden, free, large opening of the normal pleura, and with the interference of the pulmonary respiration induced by the collapse of the lung; (*b*) while the phenomena vary in intensity according to individual conditions, and in some few cases are so slight that they can be disregarded, (*c*) it is the duty of every surgeon, whenever he is about to undertake an operation on the chest or neighboring regions which might involve the pleura, to assume that pneumothorax is inevitable, and that he must be prepared to prevent or meet its evil consequences.

6. It is the risk of acute pneumothorax that has led surgeons like Krause and Tuffier to advise the detachment of the pleura to facilitate the extrapleural exploration of the lung, just as detachment of the peritoneum to facilitate the *extraperitoneal* exploration of the abdominal cavity was advised

at a time when the risk of peritonitis was more seriously feared than now. Notwithstanding Tuffier's brilliant and unique success with this method, which in 1894 permitted him not only to explore but to extirpate a tuberculous apex, the procedure is, as a rule, impracticable, and has not been repeated. The fear of shock and the interference with respiratory functions will prevent the general adoption of Bazy's method of direct intrapleural exploration which that surgeon was the first to practice with success in 1895.

Bazy makes an incision in the intercostal space just long enough to admit the index finger into the pleura, being careful to plug the wound with the finger while exploring. H. Delageniére, with less regard for the dangers of pneumothorax, would open the pleura freely for exploratory purposes, trusting to his ability to quickly seize the retreating lung and suture it to the wound to prevent complete atelectasis. Poirier, Lejars, Ricord, Monod and others have adopted Bazy's procedure, but with variable results. The advantages of free and direct *intrapleural* exploration of the lungs to determine the existence or non-existence of adhesions, to localize lesions of the lungs and other intrathoracic organs, and to determine their operability, are too obvious to be insisted upon; but such a procedure, no matter how carefully or aseptically conducted, is fraught with risk, and will never appear to the general surgeon in the same light that he now regards exploratory laparotomy. *Until the danger of seriously interfering with the respiratory functions, by inducing acute collapse of the lungs, is clearly eliminated or is reduced to a safe minimum, the analogy between the pleura and the peritoneum from the surgical point of view, will never exist.*

7. The methods that have been tried to counteract the disastrous effects of acute pneumothorax in the course of operations in the chest are, with few exceptions, more the results of instinct and empirical experience than of a clear understanding of the physiological conditions that are at fault. The dominant idea thus far has been to act in such a way as to prevent the further encroachment of air upon the crippled

lung than to restore the respiratory function by inflating the collapsed lung directly. From the days of Richerand, and long before him, as shown by the chronicles of the mediæval surgeons, by the evidence furnished in the old chirurgy of Guy de Chauliac and of Mâitre Ambroise Paré, in penetrating wounds of the chest, the first step taken by the operator was to immediately seal the opening, a practice which, in spite of the many vicissitudes which it has undergone, is still recognized as efficient in producing some measure of relief. Sealing the wound has been found to do good in all cases, but in many the relief experienced by this means is only partial, as, *e. g.*, in Doyen's case of thoracic resection for neoplasm, in which the final relief to the dyspnœa was only obtained after the air contained in the pleura had been removed by aspiration. I could also quote one of my own experiences in which I explored a wounded pericardium and lung through a large trap-door opening and yet obtained no marked relief to the pneumothorax after the external wound had been sealed completely. In other instances relief has been obtained by seizing the retreating lung and suturing it to the parietal opening which is plugged by it (Pean, Roux, Delagenière, Bayer, Murphy, Parham, etc.). This practice is sound and undoubtedly efficient, but it is only available after the shock of the primary collapse of the lung and partial asphyxia has added materially to the dangers of the operation; it is certainly not a preventive of atelectasis, and this is surely a greater desideratum than the relief of this condition when it has actually occurred. The procedure adopted by Lawson, who prepared a tuberculous lung for pneumectomy by the preliminary injection of sterilized air into the pleura, while certainly successful in his case, is not available in the majority of traumatic and acute conditions in which the maintenance of the respiratory function of the lung, and not its permanent suppression, is essential for the welfare of the patient. Neither is Witzel's suggestion to inject water so as to produce an artificial hydrothorax; nor Murphy's plan of injecting nitrogen gas an available method in acute cases, since by all of these procedures the ideal—viz.,

the maintenance of the lung function—is not considered. Dr. Murphy's latest suggestion to steady the mediastinal septum by placing a long forceps on the hilum of the collapsed lung, or by pulling and drawing it out to the external wound, is consistent with his theory of the cause of acute pneumothorax, and is, no doubt, valuable, but it is not a satisfactory solution of the problem, since it only relieves the pneumothorax *after* the initial shock of acute pulmonary suppression has been sustained.

8. The artificial or preliminary production of adhesions to obliterate the pleura, and thus obviate the dangers of atelectasis as well as of sepsis, is clearly of little avail to the surgeon who is dealing with acute conditions, or is seeking a means of diagnostic exploration. Adhesions are really serviceable only after the necessary diagnostic explorations and manipulations have been accomplished. The production of adhesions will always remain our sheet-anchor in dealing with circumscribed septic conditions in which the dangers of contamination (as in evacuating pulmonary abscesses, tuberculous vomicæ, gangrenous foci, draining cysts, etc.), are to be avoided; but when our aim is to explore the lung for the localization of these lesions, when we seek to remove foreign bodies from the bronchi or œsophagus, or when we are exploring the wounded pericardium, lung or diaphragm, or when we would extirpate thoracic, mediastinal and other neoplasms, the ideal is to maintain the respiratory function uninterruptedly until the operation is completed, after which the artificial production of adhesions will find its legitimate sphere of application.

9. Therefore, while recognizing the greater or less value of all the suggestions hitherto made to prevent pneumothorax, and to relieve it when it exists, it is still evident that the ideal indication—viz., to maintain the respiratory function of the lung in the course of intrathoracic operations—can only be successfully met by a method of direct rhythmical insufflation of the lungs through the larynx or trachea which will neutralize the collapsing effect of atmospheric pressure by increasing the intrapulmonary tension.

10. The procedure that is most effective in realizing this great desideratum—viz., the prophylaxis of pneumothorax—is the artificial inflation of the lungs and the rhythmical maintenance of artificial respiration by a tube inserted in the glottis directly connected with the bellows or an air-pump. Like other discoveries, it is not only elementary in its simplicity, but the fundamental ideas involved in this suggestion have been lying idle before the eyes of the profession for years in spite of the accumulated evidence of its utility in other non-surgical conditions.

11. While the suggestion of insufflating the lungs for the maintenance of the pulmonary function in thoracic operations is an essentially modern and very recent conception, it is only a new idea in so far as its application to thoracic surgery is concerned. In principle it is a very old one, as is shown by a glance at the history of insufflation in other fields of experimentation and therapeutic application.

12. If we investigate the subject we find the germinal ideas that have inspired its application in lung surgery in at least three different directions: 1. Insufflation as an aid in the resuscitation of persons dying, or apparently dead, from drowning or suffocation. 2. Insufflation in pediatric and obstetric practice—to restore asphyxiated infants; and, finally, 3. Intubation of the larynx for the relief of asphyxia in cases of acute and chronic laryngeal stenosis, more especially in the obstructive laryngitis of diphtheria. In all of these conditions medical history shows that even in the earliest times intrapulmonary insufflation for surgical purposes had been clearly anticipated by various appliances intended to arouse and maintain the activity of the pulmonary functions.

I. *Insufflation as an Aid in the Resuscitation of Persons Dying, or Apparently Dead, from Drowning or Suffocation.*

13. It would be embarrassing to state when insufflation for asphyxia was first suggested or practised, but it is evident that the importance of respiration and the fatal consequences of its

prolonged suspension must have been empirically appreciated by the most primitive and ancient peoples. According to Depaul, the first written references to insufflation are to be found in the Holy Scriptures. But, without retracing our steps so far back into the shadows of the past, we find, according to the same authority, that Paracelsus (1493–1541) made use of a bellows which he connected with a tube that led to the mouth of asphyxiated persons. Panarolus at a later date employed the same means to restore persons suffocated with charcoal fumes. Monroe, of Edinburgh, made use of a large bellows with which he insufflated air into the larynx through the pharynx. Subsequently the advent of experimental medicine and the study of the physiology of respiration stimulated the ingenuity of laboratory workers, and a great number of machines, pumps and bellows were devised to study the respiration by artificial insufflation with a canula inserted in the trachea.

The medical men of the latter part of the eighteenth century and those of the first half of the present century were especially active in inventing insufflating appliances. These were not only applied to animals in laboratories, but to human beings. The "emergency chests," "first aid" outfits and the "*boite de secours*" which were supplied to police surgeons and life-saving stations on the coast of England, France and the Continent were not considered complete without some form of air-pump or apparatus for intra-oral, nasal or pharyngeal insufflation.

The list of special appliances designed to accomplish the last two procedures would make up a formidable catalogue, but to quote those more generally known we would mention William Hunter's and Monroe's instruments in England, who used bellows with intralaryngeal tubes. Desgranges, of Lyons (1786), was the author of a pump which he called the "pyulque." Hans Courtois, of Tourney, in 1789, invented a double pump which alternately injected and aspirated air into the lungs through a tracheotomy canula. To avoid the complicating operation of tracheotomy, Fine, of Geneva (1800),

devised a special intralaryngeal tube made of leather, which he inserted through the nose. Pia and Garcy used long gum-elastic tubes or laryngeal catheters, which were loose fitted into the nose or into the larynx through the glottis. The experiments of Goodwyn (1788) contributed considerably toward the general adoption on the Continent of an English pump devised by Nooth. The intralaryngeal canula of James Curry (1791) was also well known. It was simpler than Courtois' machine, and could be used either in the nose, larynx or trachea. John Murray modified this appliance so that it would inject warm air. Cap, of Lyons (1828), also described an intubating-tube attached to a pump. Lecat, Louis, Tissot, Reamur, Fontana, Marc, A. Portal, in France, Johnson, in England, and Troja, in Italy, were strong advocates of insufflation of the lungs for asphyxia, believing this the best method to restore the victims of asphyxia from no matter what cause.

14. Renewed attention was excited in the question in 1829, when Leroy (D'Etiolles), in a memoir addressed to the French Academy of Sciences, declared that if at that time (1829) the number of persons saved from drowning had perceptibly diminished since the earlier days of Pia (1774), it was due to the indiscriminate application of insufflation of air into the lungs, which was then the common practice. He based his opinions on numerous experiments which he performed on rabbits, foxes, goats and sheep, in which deaths had occurred with alarming frequency as a result of the sudden and forcible insufflation of air into the trachea. Other animals, such as dogs, had resisted this sudden insufflation, and had only suffered from bad symptoms for a number of days.

The French Academy appointed a special committee, consisting of Dumeril and the celebrated physiologist Magendie, who confirmed Le Roy's observations, and extended his experiments to the dead bodies of new-born infants and adult human cadavers. These observations showed that the sudden, violent injection of air into the lungs might lead to acute emphysema, rupture of the smaller bronchi and laceration of the lungs, with the production of acute pneumothorax and secondary collapse

of the organs. The general conclusions arrived at by the committee were that, while gentle insufflation was not dangerous, there was decided danger in the practice when this was intrusted to inexperienced or unskilled hands. Notwithstanding the opposition of Marc, Albert (of Wiesenthal), Piorry and others, Le Roy's report produced a lasting impression, which was decidedly unfavorable to the further advance of the practice of insufflation and contributed largely to its decline, until 1845, when a new movement was vigorously started in its favor through the exertions of Dr. Depaul, the learned Professor of Obstetrics at the Faculté.

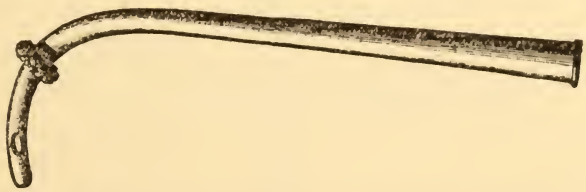
II. *Intubation of the Larynx and Insufflation of the Lungs in Pediatric and Obstetric Practice.*

15. With Depaul's advocacy of intralaryngeal insufflation in asphyxiated infants began a new and fruitful epoch in the history of insufflation. In his monumental mémoir, "Sur L'insufflation de l'air dans les voies aeriennes chez les enfants qui naissent dans un etat de mort apparente" (*Journal de Chirurgie*, 1845), he reviewed, in a masterly, exact and thorough manner, all the experimental and clinical evidence on the value of pulmonary insufflation in all its phases. He concentrated his chief effort, however, in the study of the treatment of the asphyxia of the new-born. He demonstrated that all the arguments against insufflation were idle and were based on erroneous conclusions, and proved, by numerous illustrations drawn from his vast and unlimited experience, that it was a precious and most reliable method of resuscitation in such cases. He revived the old intralaryngeal-tube of Chaussier, his predecessor at the Maternité, and established the latter's claims as the real founder of the method of insufflation in infants. [Vide Chaussier's "Considerations sur les secours aux enfants qui naissent dans un etat de mort apparente," Proces verbal de la distribution de Prix faite a la Maternité, 26 Juin, 1806.] Depaul slightly modified the Chaussier tube, and made it a permanent part of the obstetrician's outfit in his

time. He demonstrated, among other things, that the insufflation of air into the trachea was equally effective in expanding the lungs of the fœtus that had never breathed as in restoring the breathing of the infant that had already partially inhaled air.

His instrument, the Chaussier-Depaul tube, was shaped somewhat like a curved hollow conical urethral catheter with rounded end, and was provided with a flanged neck or guard which limited its penetration into the trachea. The long, extra-oral extremity was provided with a mouthpiece, to which the operator's lips were applied, and through which he blew directly into the infant's trachea (Fig. 1).

FIG. 1.



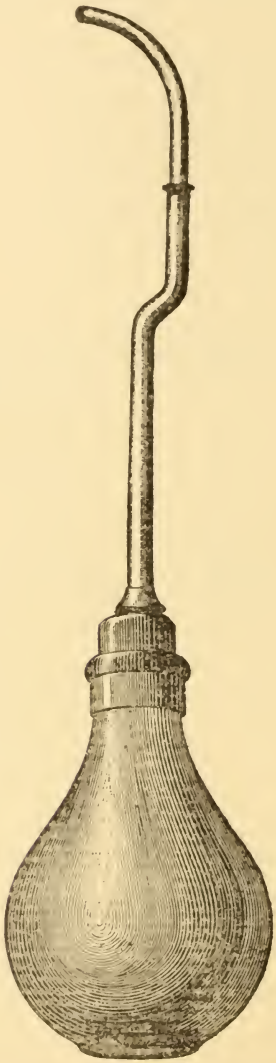
The original Chaussier tube for intubation of the larynx and insufflation of air in asphyxia neonatorum. The broad end of the tube is used for direct mouth insufflation. (From Depaul's article in the *Dictionnaire Encyclopédique*, vol. xiii., 13th series, p. 601.)

The Chaussier tube found a strong advocate in the distinguished Madame Lachapelle, who relied upon it largely in her practice. But other writers, such as Meunier and Noel, of Strassburg, Lobstein and Flamant, rejected it because of the alleged difficulties encountered in its introduction.

Depaul's persistency, however, overcame all objections made against insufflation, and new impetus was given the subject by those who busied themselves in modifying or improving his simple but effective canula. Among the numerous inventions that followed after Depaul's memoir of 1845, the "*aerophore pulmonaire*," which Dr. Gairal presented to the Academy in November, 1879, deserves special mention in this connection. It consisted in a long intubating canula provided with a short laryngeal curve which he had attached to a compressible rubber

bag, very much like the modern Politzer bag. The canula entered the glottis, and air was supplied by this rubber bulb. It

FIG. 2.



Gairal's aerophore for intraglottic intubation, with detachable rubber bulb for direct insufflation of air in asphyxia neonatorum. (From Depaul's article in the *Dictionnaire Encyclopédique*, vol. xiii., 13th series.)

differed practically from the Chaussier tube only in the addition of the rubber bulb, which took the place of the operator's lungs (Fig. 2).

In 1877, Dr. Pros, of la Rochelle, added a new but impracticable laryngeal insufflator, which was provided with a tongue depressor and an epiglottic elevator combined. This was probably never used by anyone except its originator.

In 1877, Mr. Ribemont described a new tube which differed from the old Chaussier canula in its curve. This curve was based upon an anatomical study of the parts, and had attached to it an air-pump. Its intralaryngeal end resembles and closely suggests the present form of O'Dwyer's intubating canulas. Like Gairal, he adapted a detachable bulb to the

FIG. 3.

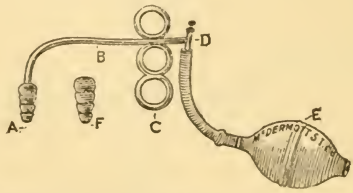
Ribemont's intubating canula for direct insufflation of air in asphyxia neonatorum. (From Depaul's article in the *Dictionnaire Encyclopédique*, vol. xiii., 13th series.)

handle of the intralaryngeal tube. The compression of the bulb was graduated by certain marks according to the quantity that it was desired to insufflate with each compression of the hand (Fig. 3). Other modifications in the insufflating apparatus were introduced by manufacturers. One of these consisted in a double or compound bellows which simultaneously aspirated the vitiated air and injected fresh, pure air, just as Doyen has done recently with his modern and ingenious apparatus.

Depaul objects to all the modifications of his tube and to all insufflating appliances as unnecessary complications. He says that at least in new-born infants the elastic recoil of the chest and lungs is amply sufficient to expel all the vitiated air during the full expiration that follows a forced inspiration. A

little experience and practice in inflating the lungs by the direct expiratory efforts of the operator will furnish an infinitely safer and more satisfactory insufflator than any mechanical inflator, since the operator is better able to appreciate the resistance of the lungs to the intrabronchial pressure. In this way the degree of inflation is thoroughly adjusted to the chest capacity. While this is no doubt true, it is nevertheless possible to obtain equally excellent results with a small bulb or bellows of 100 to 200 c.c. capacity, and in view of the greater convenience of this method to the operator, it must be regarded as an advantageous modification. In this connection I am much pleased to direct attention to the fact that one of

FIG. 4.



Dr. J. D. Bloom's adaptation of the O'Dwyer intubating canula for intraglottic insufflation in the treatment of asphyxia neonatorum.

The rings (C) are used as a handle to steady the intraglottic canula, and are constructed exactly as in the original O'Dwyer tube. The bulb (E) is a Davidson syringe rubber bulb with a valve at its free end to permit the entrance of air.

our Fellows, Dr. J. D. Bloom, the able surgeon in charge of the Charity Hospital of this city, has recently adapted the intralaryngeal canula of the O'Dwyer apparatus to the needs of pulmonary insufflation in asphyxia neonatorum (Fig. 4).

His apparatus is furnished with a rubber bulb or bag, which reminds one of the Gairal and Ribemont instruments. The conical and graduated form of the O'Dwyer tips make them fit easily into the glottis and render the instrument one of the most useful yet devised. The facility with which the O'Dwyer canula is applied, especially in the new-born infant, will, I trust, tend to popularize and revive the practice of intralaryngeal insufflation in this frequent and fatal condition, since it is by far the most direct and effective method of expanding the lungs and inducing artificial respiration. It is far superior, I

am convinced, to Laborde's rhythmic traction of the tongue, Schultze's, Sylvester's, Hall's, Daniel's, and other indirect methods that are at present in vogue in obstetric practice.

16. In a rather hasty review of the literature of artificial respiration and the various mechanical appliances that have been invented for this purpose in the course of the present century, a literature which is adequately represented by the large collection in the Surgeon General's Library at Washington, I have been struck by the close similarity, in principle at least, of two American inventions suggested and described independently and at a long interval of each other. The first is the apparatus described by Dr. Truehead, of Galveston, Texas, in 1869. (Ein Apparat Zur Kunstlichen Respiration bei Asphixia, Mitth. a.d. Sitz-Protok de Gesselschaft f. Geburtsch, in Berlin, 1869–72, i., 154–156, 2 pl.) This rather complicated appliance was originally intended to insufflate air into the lungs by means of an intubating canula which was inserted into the glottis and larynx. There are at least two sizes of the intralaryngeal pieces, graded to suit the ages of the patients (chiefly new-born infants). The laryngeal piece is pyriform in shape, and is made to conform with the size and outline of the glottic orifice. It fits closely to the larynx, and its conical shape facilitates its tampon action. The mouthpiece is shaped like a curved catheter, and this is connected to a bellows which works on a vertical axis and automatically injects and aspirates air in and out of the trachea in a rhythmical fashion. As a true intubating canula and respiratory machine supplied by a bellows, it clearly anticipates (though it is far more complicated) the second American invention with which we are familiarly acquainted as the Fell-O'Dwyer apparatus. Truehead's description is fully detailed and well illustrated in *Transactions of the Berlin Obstetrical Society for* 1869–72. I have not been able to find any reference to Dr. Truehead's original work in English, and my only source of information is from the paper in the German proceedings. It is certainly worthy of a distinct place in the history of American inventions for the relief of asphyxia neonatorum, and is entitled to

precedence over the Fell-O'Dwyer apparatus, as it anticipates in principle almost all the essential characteristics of this latter but more simple appliance. It is curious that, notwithstanding its American origin, we should have been so thoroughly ignorant of its existence in this country, and that we should be compelled to acknowledge our indebtedness for all the information available to German sources.

III. *Intubation of the Larynx.*

17. Another source of inspiration which has led to the present form of intralaryngeal insufflation by intubation as a substitute for the tracheotomy canula for surgical purposes is found in the efforts made at various times in mediæval history to intubate the larynx for the relief of asphyxia when caused by acute or chronic laryngeal obstruction. The suggestion which culminated in O'Dwyer's epoch-making observations, first published in January, 1880, can be traced back, as we are told by Dillon Brown, to Hippocrates, who said that "canulas should be carried into the throat along the jaws, so that air may be drawn into the lungs." Intubation was practised by Desault in 1801, by Finaz in 1813, and subsequently by Lallemand, Benoit, Depaul, Loiseau and Gros, in France; by Weinlechner, Trendelenburg and Von Huttenbremer, in Germany; by Patton, Liston, Sanctuary and MacEwen in England; by Horace Green in this country, and by a host of others too numerous to mention. But the experiments of all these workers, with the solitary exception of Bouchut's brief experiments and failures with short tubes, in 1858, were made with catheters or long tubes of similar construction. It is to O'Dwyer, therefore, that the greatest credit is due for establishing intubation in its present form, and it is due to his unswerving and indefatigable perseverance, patience and mechanical ingenuity that the present form of apparatus has attained its present marvellous efficiency.

18. O'Dwyer's resurrection of Bouchut's crude ideas on intubation, and his magical transformation of the bloody and

tragic picture of tracheotomy in diphtheria into a simple, painless and bloodless bit of technical jugglery, has practically closed for all times one of the most animated chapters in the history of surgery. By similarly transforming the tracheotomy canula of the insufflating apparatus that Dr. Fell, of Buffalo, has devised for the sustained practice of artificial respiration in opium narcosis he has opened a new chapter of still greater interest and promise than that which his previous achievements had brought to a close.

19. While thus, according to Fell and O'Dwyer, all the credit that is due them as independent investigators, and for perfecting and simplifying an apparatus which has proven itself thoroughly efficient and reliable in maintaining artificial respiration, it must be recognized that the idea of applying this method to the needs of the thoracic surgery originated in other sources, and that in writing the history of the subject in its surgical relations, due credit must be given to other and independent investigators.

IV. *History of Pulmonary Insufflation as Applied to the Surgery of the Chest.*

20. It is difficult, if not impossible, to ascertain to whom belongs the credit of first suggesting the value of pulmonary insufflation in thoracic surgery. It is probable that the same thought occurred to many observers who were interested in the same problem simultaneously. As indicated by the preceding review of the evidence, it is plain that no originality can be claimed for the procedure itself, or even for the appliances used, since we see that the fundamental ideas have been thoroughly exhausted by a large number of investigators who during the eighteenth century developed the practice by successive contributions until it reached its maturity at the present time. In its surgical phases the thought of inflating the lungs to counteract the evil effects of pneumothorax must have forced itself upon the attention of many of the practical surgeons of the modern period—the period of the Listerian renaissance—in which the feverish activity of the enterprising operators in

quest of new fields of splanchnic conquest found itself blocked by this apparently insurmountable barrier in the thorax. They must have realized that while all the other conditions for success were ripe for the invasion of the chest this one great desideratum was still lacking.

21. In trying to discover when and where this suggestion originated, or where it was at least first put on record, we find that most of the references cluster about the period embraced from 1872 to the present time. Pean, the distinguished Parisian surgeon, is reported to have appreciated the importance of increasing the intrabronchial pressure in intrathoracic operations. In one instance in which he resected a portion of the sternum for the removal of a mediastinal growth he operated in a chamber much like a diving-bell, within which a pressure of two atmospheres was maintained. The operation presented great difficulties, and the patient died on the second day. I can find no reference to this case, but I quote it from H. Milton, of Cairo (*Lancet*, London, March 27, 1897). Délorme, in a discussion at the Société de Chirurgie, February 16, 1897, referred to M. Lambotte, a Belgian surgeon, as having advised, some time before him, the artificial inflation of the lung in surgical conditions. Délorme himself said that the need of an appliance to inflate the lungs had occurred to him when he first performed his operation of decortication and liberation of the imprisoned lung in chronic empyema. But the surprising manner in which the lung expanded spontaneously and filled the pleural cavity after it had been released from its confining shell of exudates, in his first case, and in another, operated upon by Lardy, of Constantinople, showed him that the expansion of the lung could be effected without the help of such appliances and by the efforts of nature alone. He believed that a sufficient increase in the intrabronchial pressure is obtained by the closure of the glottis in the paroxysms of cough that occur in the course of the operation. But that nature's unaided efforts are uncertain and cannot be trusted under such circumstances is proven by other operators who, in more than twenty-seven instances of the same kind, have

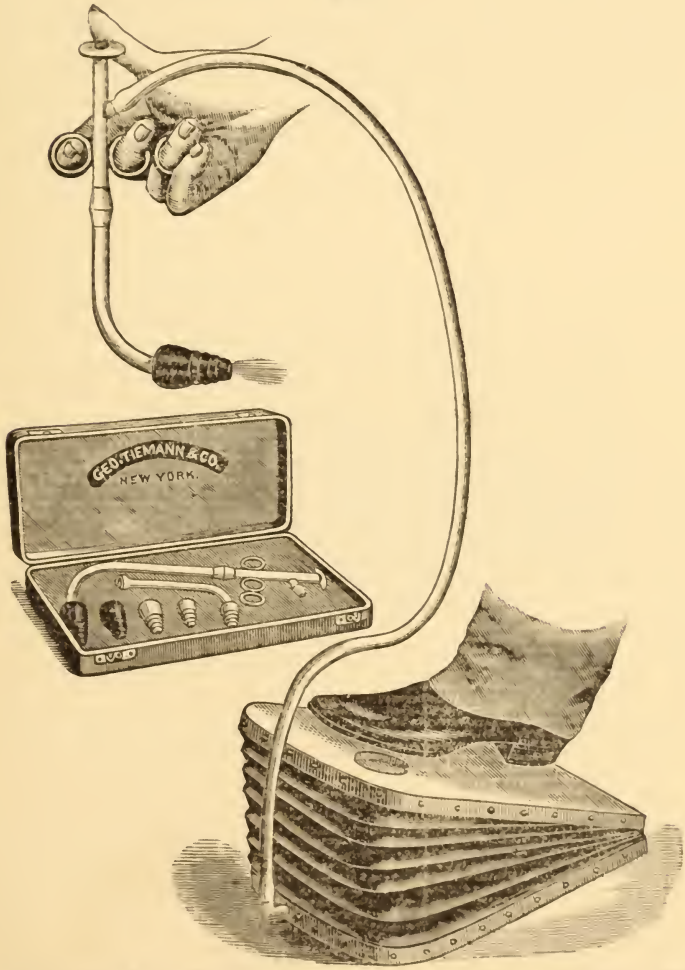
adopted Delorme's procedure. Cases of this class in which the lung is forced into activity after a long period of inaction, and when ample opportunity is given to the organism to accommodate itself to a crippled respiratory function, are not apposite to the acute conditions here considered, as in these the desideratum is to obtain a certain means to prevent acute pneumothorax in surgical operations. But it is to Tuffier and Quenu, with their associates Hallion and Longuet, and to Doyen and to H. Milton, that we owe the chief debt of recognition for their scientific demonstration of the value of artificial inflation of the lung through the larynx for the prevention and relief of surgical pneumothorax. Tuffier and Hallion reported their first experiments to the Société de Biologie, November 21, 1896, and Tuffier read a paper on the same subject in the Société de Chirurgie in February, 1897, *Bulletin et Mem. Société de Chirurgie*, February and March, 1897. The great merit of these observers is that they obtained the result by insufflating the lung through an intralaryngeal tube, and that they secured the necessary data by which to regulate the intrabronchial pressure with scientific accuracy.

Coincidentally with Tuffier and Hallion's experiments with intubation, Quenu and Longuet undertook an extensive series of researches chiefly with the view of ascertaining the best means of securing pleural adhesions. Realizing all the difficulties which attended this procedure whenever it was attempted after collapse of the lung had taken place, they independently began to experiment with insufflation of the lungs by means of a cylinder of compressed air connected to a canula tied to the trachea. They also tried the simpler plan of making the animal breathe in an atmosphere of compressed air by enclosing the head in an apparatus somewhat like a diver's suit. Notwithstanding the manifest imperfections of their methods, as compared with those of Tuffier and Hallion, they convinced themselves of the enormous advantages of any procedure that will force the lung to remain in contact with the chest wall. They also observed the facility and safety with which the lung can be explored; and, in addition, the tendency to spontaneous

hæmostasis displayed by the lung when it becomes herniated in the parietal wound under these conditions. In conclusion, they state their conviction that it is in this direction that further efforts must be made if the surgery of the chest is to make further advances. Following closely upon the studies made in France, Mr. H. Milton, of the Medical School of Cairo, Egypt, published an article on mediastinal surgery in the London *Lancet*, March 27, 1897, pp. 1872-75, in which he describes an original procedure for the free exploration of the anterior mediastinal organs. He demonstrated in this communication not only that the mediastinal contents are accessible to the surgeon, but that by tracheal insufflation with a bellows communicating in the trachea through a canula, that the dangers of surgical pneumothorax could be overcome. This operation, called by him "the median normal thoracic incision," consists in a long incision which extends from the cricoid cartilage to the xiphoid appendix in the median line. He saws the sternum in half, and each half is forcibly retracted, leaving an open space between the bones four or five centimetres broad, which permits easy exposure and exploration of the trachea, the vessel at the root of the heart, innominate artery and veins, pericardium, bronchi, lungs and pleuræ. He first tried his procedure on a goat. In the course of the operation the pleura was torn, and fatal pulmonary collapse would have followed had he not resorted to direct insufflation through the tracheal canula, thus immediately distending the lungs and maintaining artificial respiration. He then closed the pleural rent, and the animal recovered without signs of very serious disturbance. Satisfied with this result, he operated upon an Egyptian fellah, who had tuberculosis of the sternum and mediastinal glands. The patient recovered. He demonstrated by this case that even after the total suppression of costal respiration, which must follow the excision of the sternum, the diaphragm is quite sufficient for the needs of pulmonary respiration. Milton's merit consists not only in demonstrating the technical practicability of opening the anterior mediastinum as a route to surgical intervention in the human subject,

but in the fact that he was one of the first, if not the first, to operate on a human patient with a thorough knowledge and

FIG. 5.

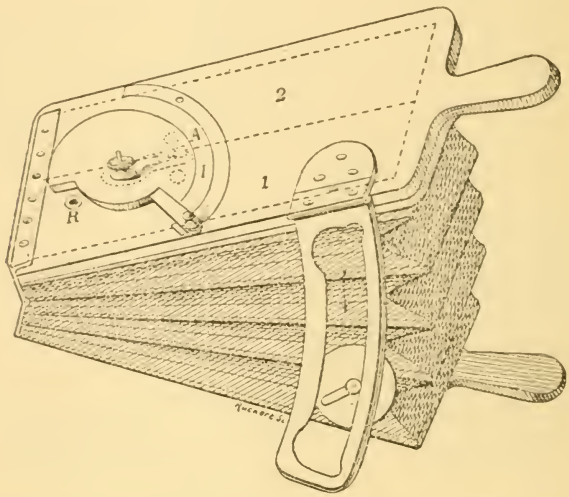


The original Fell-O'Dwyer apparatus as used in the Presbyterian Hospital of New York. (From *Medical and Surgical Reports of the Presbyterian Hospital* for 1896. See article by Dr. W. P. Northrup, p. 132.)

appreciation of the value of insufflation in preventing the accidents of pneumothorax.

The experimental work done in France by Tuffier and Quenu was limited to dogs and other animals, and was done with imperfect instruments, but the practical, ever-ready mechanical genius of Dr. Doyen, of Rheims, now of Paris, promptly grasped the possibilities of the method, and we now owe to him the first finished model of an intubating and insufflating apparatus for the systematic application of this treatment as a preventive of pneumothorax.

FIG. 6.



Doyen's compound automatic hand-bellows for insufflation and aspiration of air in and out of the lungs. (From Doyen's *Technique Chirugicale*, p. 128.)

This apparatus was first described in his admirable treatise, "Technique Chirurgicale," pp. 129–133, which was published in 1897, and subsequently in a short article, "La Chirurgie du poumon," which appeared in the *Revue de Therapeutique Medico-Chirurgicale*, January 15, 1898, vol. lxv. We presume that his invention was the result of independent studies on the subject, as he does not mention the researches of his contemporaries in his work. His apparatus consists in a set of intubation canulas which fit into the glottis and are introduced by a special forceps.

These tubes have a close resemblance to the O'Dwyer tubes for intubation in diphtheria (he does not mention O'Dwyer, however), and are connected with a hand-bellows of his own device, which may be used either as an insufflator or an aspirator. The bellows is a double chamber which automatically injects and aspirates when closed or opened, by means of the vertical movements of the handles. One of the chambers receives air or oxygen, and the other the expired or aspirated air from the patient. It is not easy to describe the mechanical details, but the accompanying figure will give a clear idea of its appearance.

From all this we see that Tuffier and Hallion, Quenu, Longuet, Doyen and Milton were working at the same problem at about the same time; that is, in the course of three years they all arrived at the same conclusions independently of each other.

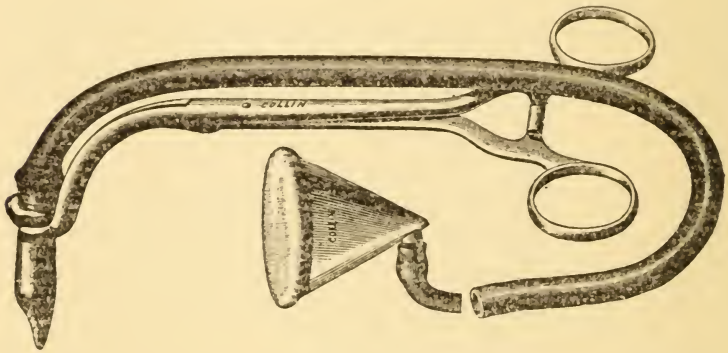
. . . . . .

22. My personal experience in thoracic cases and the evidence I had gathered in the course of animal experimentation had long ago impressed me with the importance of acute pneumothorax as one of the most formidable bars to the successful issue of intrathoracic operations, and kept me alert for all practical suggestions to counteract it. But it was not until 1897, when I read an account of Tuffier and Hallion's experiments as reported to the Société de Biologie, November 21, 1896, that I realized that thoracic surgery was on the eve of a revolutionary innovation.

I was particularly impressed with the experiments on a dog in whose larynx Tuffier inserted through the mouth a long copper tube attached to a bellows. Artificial respiration being thus established, the pleura was freely incised through an intercostal space, and the edges of the wound were kept apart to allow air to enter freely. The pleural cavity was then illuminated with a small incandescent lamp, and it then became an easy matter to perform operations on the œsophagus and pneumogastric nerve, etc., without interfering with the respiration. This and other dogs similarly treated survived several months without suffering serious disturbances. About this

time I received a copy of the medical and surgical reports of the Presbyterian Hospital of New York for 1896, which contained a brief but excellent article on the use of the Fell-O'Dwyer apparatus for the treatment of opium narcosis in other non-surgical conditions in which prolonged artificial respiration was necessary to overcome the failure of the respiration (see Fig. 5). The reading of this article, together with the repeated demonstration of its unfailing and almost marvellous efficiency in similar cases, at the hands of our colleague, Dr. J. D. Bloom, at the Charity Hospital, immediately suggested

FIG. 7.



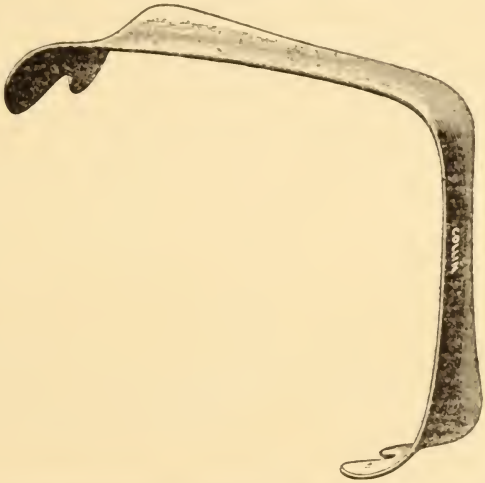
Doyen's intralaryngeal tube and rubber connections, with funnel attached, for laryngeal tamponade and chloroform anæsthesia. The cut shows the special forceps used to introduce the tube. The intubating canula may be used for direct air insufflation. (From Doyen's *Technique Chirurgicale*, Fig. 43, p. 123.)

to my mind a solution of the difficult problem that had so long interested me. The suggestion grew upon me, but I had no favorable opportunity in which to try the apparatus. Still, I felt so confident in its reliability and future importance in advancing the interests of intrathoracic surgery that I made pulmonary insufflation with the Fell-O'Dwyer apparatus one of the main topics of my address as chairman of the section of surgery at the meeting of the Louisiana State Medical Society, held May 10, 1898.

The suggestions then made fortunately fell on fertile soil, and I am gratified at the thought that their correctness

should have been so brilliantly demonstrated by my colleague, Dr. Parham, whose interesting and brilliant case of resection of the chest walls for sarcoma served as a basis for the

FIG. 8.



Doyen's tongue retractor for the application of intralaryngeal intubation. (Fig. 44, p. 123, *Technique Chirurgicale.*)

exhaustive and learned monograph which he contributed last year with so much credit to himself and to the proceedings of this Association.[1]

V. *The Technique of Pulmonary Insufflation as Applied in Thoracic Surgery.*

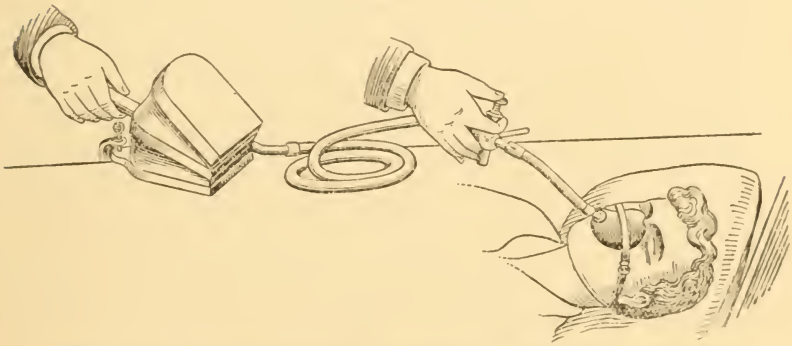
23. The history of artificial respiration by insufflating the lung through an intraglottic canula would scarcely be complete without some reference to the technique of its application in the most recent phase of its development—thoracic surgery. Fortunately this is elementary in its simplicity, and needs but

[1] Thoracic Resection for Tumor Growing from the Bony Wall of the Chest, by F. W. Parham, M.D. Transactions Southern Surgical and Gynecological Association, vol. xi., 1899.

little experience for its successful application in practice. All that is required is: 1. A properly shaped tube which will fit in the larynx while it is steadily held in place by the hand of the operator. 2. A tubular attachment leading to a bellows which will furnish the requisite pneumatic power to distend the lungs. As stated by O'Dwyer in his commentary upon the original Fell apparatus, all that is required is to get air into the lungs and give it sufficient room to expand and time to escape; the power generated and stored up in overcoming the resistance to inspiration being amply sufficient to carry on expiration. This is precisely what Chaussier, Depaul, Marc, Gairal, Ribemont and a host of others practically ascertained long ago. Since no mechanical assistance is required for expiration all complex pumps and bellows which alternately inflate and aspirate the lungs are superfluous, and, if anything, disadvantageous. It is only in certain conditions that an occasional sustained aspiration may be serviceable in facilitating the expulsion of mucus, water or foreign bodies that may be present in the trachea, but these conditions are rare since the strong expiratory efforts which follow a forced inspiration usually accomplishes all that is required without artificial assistance. No instrument of precision is needed in practice to measure the exact amount of air pressure that is required to distend the lungs. All that is required in practice is to observe the effect of the insufflation on the patient himself: the elevation of the ribs, filling of the intercostal spaces and bulging of the epigastrium. These tell immediately when insufflation is doing its work. The depression of the ribs, sinking of the epigastrium and hollowing of the intercostal spaces tell us exactly when and to what extent expiration has occurred. It is only important that the apparatus should be provided with a bellows or an air-pump large enough to insufflate the amount of air that is required to fill up the lungs with one continuous movement. It is also important that the intralaryngeal canula should be large for the free and unobstructed expulsion of the expired air. This is exactly what the apparatus devised by George H. Fell, of Buffalo, and modified by O'Dwyer will

accomplish. The apparatus originally presented by Dr. Fell at the International Congress held in Washington, September 7, 1893, consisted simply of a hand bellows connected to a tube inserted in the trachea; this apparatus he modified himself by substituting for the tracheotomy tube a face mask which closely fitted over the nose and mouth; the air was thus forced into the larynx through the natural passages, and the expired air was allowed to escape externally by a side outlet in the injecting tube, the outlet being opened or closed by the finger of the operator (see Fig. 9). The disadvantages and uncer-

FIG. 9.



The original Fell apparatus for artificial respiration. (From *Truax's Mechanics of Surgery*, p. 215.

This shows the face shield and air central valve. In many cases of simple narcosis this apparatus will suffice, but for surgical insufflation of the lungs the intraglottic intubation attachment of O'Dwyer is indispensable. The hand-bellows devised by Fell, with hose and valve, may be used with the O'Dwyer intubator.

tainties of the oro-nasal method have been so thoroughly pointed out by all observers from the most ancient times to the present, that we need not insist upon them. Hence, we find that in cases in which the simple oro-nasal method is not satisfactory, Fell resorts to the tracheotomy. The additional dangers of tracheotomy led O'Dwyer to so completely modify Fell's appliance that the apparatus at present sold by manufacturers as the Fell-O'Dwyer apparatus is in reality an original instrument solely in virtue of O'Dwyer's modification. O'Dwyer's improvement consists in a long intubation canula

that is fitted with a conical tip so graduated in size that it will fit almost any larynx. There are several laryngeal tips—to fit the larynx according to ages. The conical tip is so designed that it will readily wedge itself into the glottis, and prevent air from escaping between it and the laryngeal walls. The proximal end at the handle is practically bifurcated, one branch receiving the ingoing air from the bellows, the other branch stopped by the operator's thumb (which acts as a valve), serves as an exit for the air (see Fig. 5). While I have shown in the historical part of this paper that the O'Dwyer apparatus as it is known at present has been anticipated in its individual constituent parts as well as in the principles of its action by many experiments, it must be recognized that for simplicity and efficiency it has no rival. It is also quite original in some details of importance, more especially in the form of the tips which are admirably adapted to fit the larynx of all patients and all ages and in the control of the outlet which is opened and closed by the thumb of the operator, thus dispensing with all mechanical valvular arrangements.

O'Dwyer's instrument possesses several advantages over the apparatus designed by Doyen (see Figs. 6, 7 and 8): First, in the greater ease of its introduction; second, in the better adaptation to the various sizes of the glottic aperture through its graduated conical tips; third, in the fact that it is a continuous resisting metallic instrument from the glottis to the handle, and requires no auxiliary forceps for its introduction; fourth, in the fact that it can be used as a tractor which favors the elevation of the larynx and steadies the tongue; fifth, in the fact that it can remain *in situ* and still permit of normal respiration or of artificial respiration when this is required; sixth, in the security that it furnishes against accidental obstruction by the bite of the patient. (The Doyen connecting tube is made of rubber, and can be easily compressed between the jaws.) As a whole, therefore, it is difficult to conceive any contrivance better adapted for its purpose than the O'Dwyer instrument.

Since its introduction in the Charity Hospital, Dr. Bloom has found it advantageous to modify the accessory or inflating part

of the apparatus by several additions which deserve mention, as they save unnecessary exertion on the part of the operator and diminish the strain on the bellows. These consist in the addition of a long lever, which is used as a treadle to compress the bellows with the foot, and in the addition of a metallic cylinder which is fitted with absorbent cotton to filter the air as it passes from the bellows to the patient (see Fig. 10, Dr. Bloom's modification of the Fell-O'Dwyer apparatus).

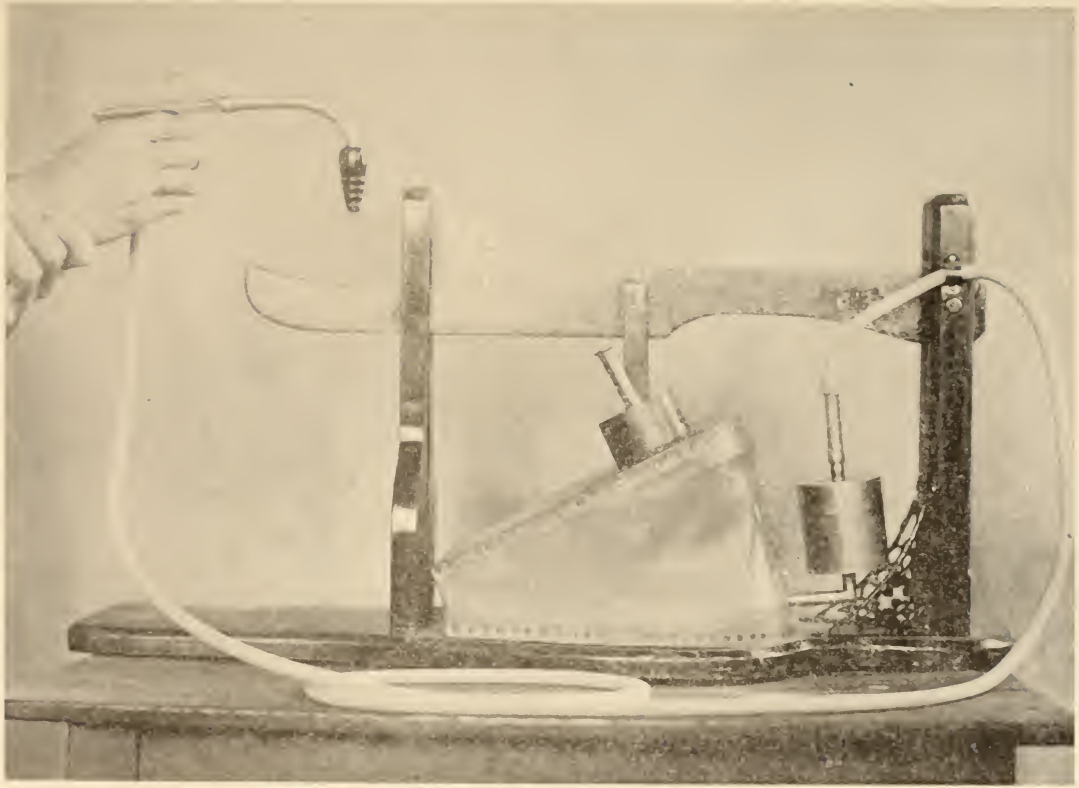
24. In constructing an insufflating apparatus for my own use it also occurred to me that the original O'Dwyer apparatus could be advantageously modified for surgical purposes. As originally designed, the Fell-O'Dwyer apparatus was intended solely for non-surgical conditions, principally for the treatment of opium narcosis. Consequently no provision was made by the originators for the maintenance of anæsthesia while artificial respiration was being applied. I have, therefore, altered the laryngeal canula by furnishing a branch and stopcock, which are connected to a rubber tube and funnel. The funnel is covered with a flannel screen, and is used as an inhaler exactly as in the Trendelenburg canula.

The idea of administering anæsthetics by intubation directly into the larynx is also a suggestion that has occurred to several surgeons. Junker, I believe, at one time referred to it, and illustrates an apparatus for the purpose attached to his inhaler. Doyen uses a tube and funnel attached to his intubating canula, but has made no provision for this necessity in his insufflating apparatus. Our fellow and colleague, Dr. Souchon, in 1895, while experimenting with various methods of anæsthesia in nasopharyngeal practice, tried to administer chloroform through an intubating tube, but owing to the imperfection of the instrument and other difficulties he did not persist in this direction. The advantages of combining an anæsthetic apparatus which can be readily controlled, together with an intralaryngeal tampon canula and insufflating apparatus, can be easily realized by anyone who has given any thought to this difficult and formidable phase of surgery. I have also modified the O'Dwyer instrument by altering the shape of the handle; in

the apparatus here shown (see Fig. 11, author's modification of the Fell-O'Dwyer apparatus), the handle is shaped like that of a pistol; this shape permits of easy traction on the larynx and root of the tongue, a matter of no small consequence in amputations and operations on this organ, which is very desirable to bring the vascular and less accessible regions of the base as near the line of the teeth as possible. In addition to this I have added a registering mercurial manometer which will gauge the actual amount of pressure required to inflate the lungs. While this is not essential, the addition of a gauge transforms the original empirical apparatus into an instrument of precision which will be helpful when the instrument is to be handled by unskilled or inexperienced persons. It is important that the operator should always remember that the safety of insufflation of the lungs rests largely upon the manner in which it is applied, and that violence, undue haste and excessive pressure are liable to defeat the very purposes for which the instrument is intended. Tuffier and Hallion demonstrated in their experiments that a pressure of 6 mm. mercury is all that is required to overcome the elasticity of the lung and equalize the air pressure. They also determined that an intrabronchial pressure equal to 33 mm. mercury arrested respiration. Hence the importance of thorough instruction in these matters and the value of a manometer for teaching purposes. I have also modified the apparatus so that it is provided with one aspirating as well as insufflating valve. While the aspirating valve is rarely used, it may occasionally find application in cases of excessive clogging of the larynx with mucus, food, foreign matter, and other substances that may threaten life by their presence. Furthermore, the aspirating valve may be utilized to insufflate oxygen pure or mixed with atmospheric air.

25. In summing up the peculiarities of the apparatus that I have the pleasure of exhibiting to you I would call attention to the following facts:

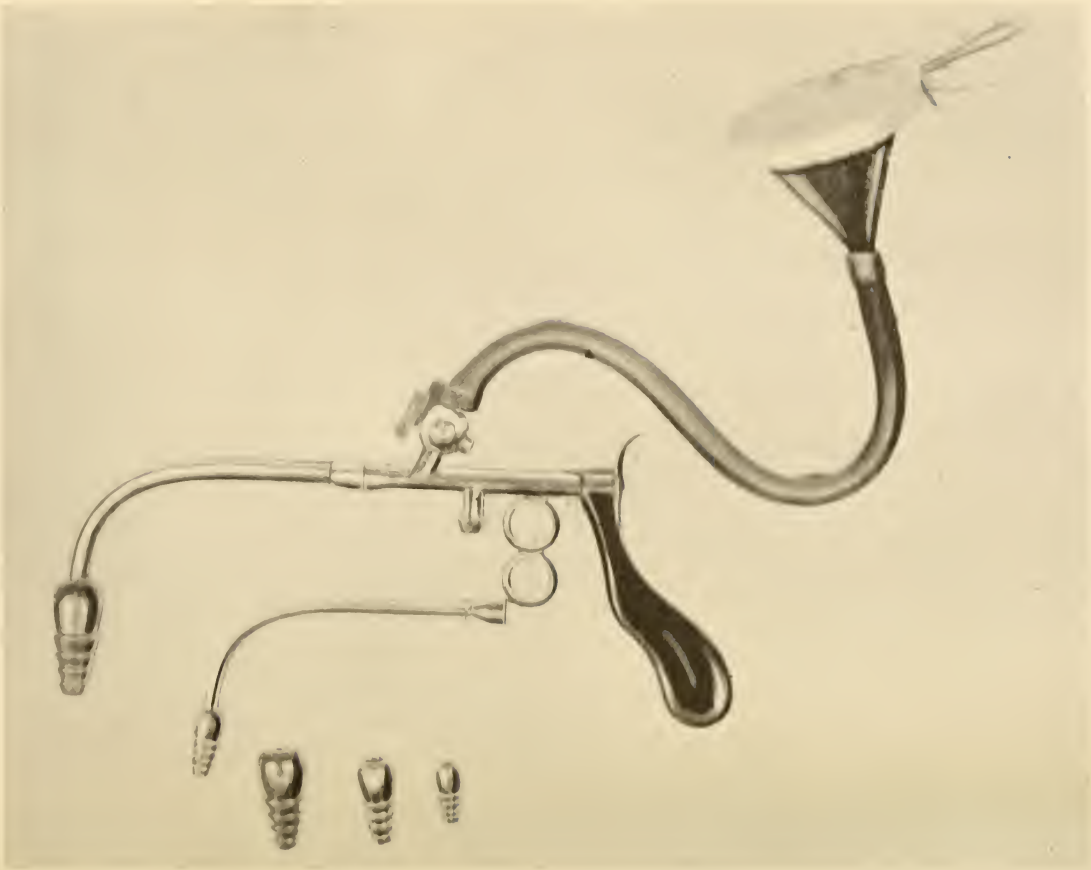
The original O'Dwyer canula, while retaining its intralaryngeal portion unchanged, is modified so that it may be utilized: 1st, as a respirator; 2d, as a tampon canula; 3d, as an anæs-



Dr. J. D. Bloom's modification of the Fell-O'Dwyer apparatus as used in the Charity Hospital of New Orleans. The following points can be readily noticed in the illustration:

1. Bellows for insufflating air
2. Cylinder and tube over inlet of bellows. The tube may be attached to an oxygen gas bag or cylinder, in cases of asphyxia, in which it is desirable to supply pure or diluted oxygen directly to lungs.
3. Cylinder filled with absorbent cotton to filter the air after it has escaped from the bellows.
4. Rubber tubing connecting bellows with intralaryngeal tube.
5. Intralaryngeal tube and handle. (Original O'Dwyer instrument.)
6. Treadle or lever operated by the foot to compress bellows. May also be used as a hand-lever

Fig. 11.



The author's modification of O'Dwyer's intubating apparatus for surgical cases in which artificial respiration or pulmonary insufflation may be required with anæsthesia. The stopcock controls the supply of the anæsthetic without interfering with the passage of air furnished by the bellows or air pump.

thetizer; 4th, as a tractor of the larynx and tongue; 5th, as an insufflator; 6th, as an aspirator. I need not emphasize the value of an intralaryngeal apparatus that while allowing of anæsthesia and artificial respiration will also act as a laryngeal plug.

In this way the complicating operation of tracheotomy is eliminated, and extensive operations on the tongue, palate, nose and nasopharynx, in which Kocher's pharyngeal tamponade is indicated, can be performed without risk of suffocation from the entrance of blood in the larynx, and without resorting to Rose's position.

Anyone who has attempted the removal of a vascular fibroma of the pharyngeal vault, or has tried the total extirpation of the tongue, will readily appreciate the value of an apparatus that will permit of easy respiration while the larynx is securely plugged.

While I fully recognize the comparative rarity of the cases in which intralaryngeal tamponade is required, and I am the first to admit that with the help of a modified or mixed morphine-chloroform anæsthesia and Rose's position, the majority of oropharyngeal operations can be performed without the aid of an intubating apparatus, I believe that there are occasions in the practice of every active surgeon in which such an apparatus as I have shown you will prove a veritable Godsend.[1]

[1] Since the reading of this paper and the exhibition of my apparatus before the Association I have experimented with the view of substituting an air-pump operated by the hand for the bellows of the Fell-O'Dwyer apparatus. The action of the pneumatic pump can be regulated with the ease and nicety of an instrument of precision, and, when combined with a manometer and aspirating valve, is more suitable as a permanent instrument for hospital use, where the frequent calls made upon the apparatus are not as likely to impair its efficiency as in the case of the ordinary bellows. This last model has not yet been completed, and is, therefore, not illustrated in this paper.

Bibliographical References.

In addition to the references given in the text the author acknowledges his indebtedness to the following sources of information:

Article "Asphyxia," by Maurice Perrin, Dict. Encycloped. des Sciences Med. Dechambre, Tome vi., 1868.

Article "Nouveau-né," by Depaul, Dict. Encycloped. Dechambre, vol xiii. (2 me Série), 1879.

Depaul, Bulletin de l'Académie de Médecine, Sept. 4, 1877.

Article "Respiration Artificielle," by Ch. Vibert, Nouveau Dict. de Med. et de Chirurgie pratiques (Jaccoud), vol. xxxi., 1882.

Article "Submersion," by G. Tourdes, Dict. Encyclop. des Sciences Med., Dechambre, Tome xii., 3 me Série, 1883.

By the author: The Surgery of the Chest and Some of the Problems Related to the Treatment of its Penetrating Traumatisms and their Immediate Complications. An address by the chairman of the Section of Surgery. Trans. La. State Med. Society, 1898. [The first twelve propositions in the introductory section of this paper are almost literal condensations of statements made in this address.]

By the author: On the Management of Acute Traumatic Pneumothorax. Annals of Surgery. Philada., vol. xxix., January-June, 1899, pp. 409–434.

DISCUSSION.

Dr. F. W. Parham, of New Orleans, Louisiana.—I would like to show a patient in connection with the paper of Dr. Matas. The case is reported in last year's Transactions as a successful operation on the thoracic parietes. This case is referred to by the essayist in his paper on insufflation. This was the second case I operated on. The first one was operated on in April, 1897, at a time when I was not so convinced of the efficacy of artificial respiration practically carried out during operations on the chest as I am now. In that case I used the Fell-O'Dwyer apparatus for forced respiration. I had not done this in my first case and had a great deal of trouble because I did not do so. I found it made a marvellous difference in doing this kind of surgery. The Fell-O'Dwyer apparatus enables one to hold the lung in contact with the chest-wall until it can be sutured in the thoracic defect. This case was operated on sixteen months ago, a diagnosis having been made of spindle-cell sarcoma. You will notice the opening. You can feel the heart distinctly. I present this patient to emphasize what Dr. Matas has said with regard to the beneficial effects of the Fell-O'Dwyer apparatus in maintaining artificial respiration while the cavity is open. The plan of

procedure would be this: Having cut down to the pleura, if it is possible to remove the tumor without cutting into the pleura, the Fell-O'Dwyer apparatus is not needed, but to go as far with the operation without the apparatus as possible. If the pleura should be accidentally opened before you are ready, you can plug it with gauze, and work at some other portion of the field of operation. Go as far without the apparatus as possible. When the pleural opening is too wide to close with gauze tamponade, the Fell-O'Dwyer is at once brought into use. I had the assistance of Dr. Bloom, who is more expert in the use of the apparatus than anyone I know of in this city. He introduced the apparatus promptly when I gave him the word that the pleura was opened, and at once the collapsed lung recovered itself and the general collapse disappeared. There was nothing more beautiful than to watch the action of the Fell-O'Dwyer apparatus in saving the man from impending death from collapse of the lung.

Dr. Matas has gone over the subject so thoroughly, and I have referred to these measures of insufflation to such extent myself in my article published in last year's Transactions, that I content myself with showing this case and contrasting it with a few of the cases reported in that paper, thus conspicuously exhibiting the immense value of the Fell-O'Dwyer apparatus. As I make the patient cough, you will see that in expiration there is a bulging of the thoracic wound, the air rushing in from the other lung and forcing out the movable hiatus in the lung wall. It is now sixteen months since the operation was performed on this patient, and thus far there is absolutely no recurrence of the disease.

Dr. J. D. Bloom, of New Orleans, Louisiana.—Reference has been made to some improvement in the apparatus in cases of asphyxia in the new-born. In our maternity service at the hospital we frequently have infants born asphyxiated, and this contrivance is a modification of the Fell-O'Dwyer apparatus in that it has a ball valve. It does not necessitate the use of the finger in expiration, and it works better in this position (illustrating) than in the erect position. This is a bulb attachment to demonstrate its use in the infant after its insertion into the larynx. This instrument enables us to carry on respiratory action without any further traumatism to the child or without any further manipulation.

I do not know that there is anything in particular that can be added to the excellent paper of Dr. Matas, as he has covered the field very thoroughly. We use (our improvement of) the large or adult apparatus in the hospital in cases of opium poisoning, and frequently carry on respiratory action for twelve and fifteen hours with it, after the insertion of the apparatus, by relays of students. We have found it highly satisfactory, and I am confident that the mortality rate is far less than it was previous to the introduction of the instrument into the institution. As an emergency expedient in chloroform anæsthesia attending surgical operations it is of great value.

RECTOVAGINAL FISTULA: A CLINICAL NOTE.

By Lewis S. McMurtry, M.D.,
Louisville.

Excluding cancer extending from the cervix uteri, rectovaginal fistula is due to traumatism, not to compression of the tissues (as in vesicovaginal fistula), but extensive rupture of the perineum, involving the rectovaginal septum, cicatrizing inferiorly, leaving a perforation above where the septum is thin and permits contact of the vaginal and rectal mucous membranes, thus uniting these membranes and making a permanent opening. Wounds made in instrumentation through the vagina, and the pressure of foreign bodies retained in the vagina sufficiently long to produce ulceration and necrosis, are among the rare causes of this lesion.

The most common site is in the lower portion of the vagina, just above the sphincter muscles, and at the point already indicated, where the septum is thin and the mucous surfaces are in close proximity one to the other. The opening is usually very small, and the mucous membrane is reflected around like a fringe, making its detection more amenable to touch than to sight. The method usually applied to the repair of vesicovaginal fistulæ, whereby the edges are freshened in a funnel-shaped denudation, will rarely succeed in repairing a rectovaginal fistula. The action of the anal sphincter, the penetration of fecal matter, and the sparse layer of tissue prevent repair by this method. The divulsion of the sphincter muscle will not suffice to overcome this obstacle to success in the larger proportion of cases. Exten-

sive cicatricial deposit is another obstacle to repair by this simple procedure.

The operation in consequence is resolved into a modified perineorrhaphy, by which the fistula is transformed into a complete tear of the perineum. The method of flap-splitting popularized by Mr. Lawson Tait is pre-eminently applicable to the procedure. By this method broad surfaces are supplied without loss of tissue, and it permits gliding of the vaginal and rectal orifices of the fistula so as to interpose firm and healthy tissues.

In exceptional cases, where the fistula is so low down as to be within the grasp of the sphincter, it will be best to divide the septum vertically, freshen liberally the margins of the fistula, and suture the surfaces as in complete laceration of the perineum.

In a very limited class of cases, wherein the fistula is small and cicatricial deposit is not extensive, a simple denudation and suturing after divulsion of the sphincter ani muscle may succeed.

The flap-splitting method already mentioned will be found most applicable, and should be preferred for general application. Vertical division of the septum should be the first step of the operation in low fistulæ with extensive cicatricial deposit, and the operation is then resolved, after paring the edges of the fistula, into the operation for complete tear of the perineum. It will rarely be necessary to use buried sutures ; when used these should be of catgut and should be introduced after the Lembert plan. As already stated, the flap-splitting operation of Lawson Tait has its greatest field of usefulness in this procedure.

The following case is of special interest, both on account of the unique cause of the fistula and the consequent deduction that a very simple and common gynecological appliance is not without danger under certain circumstances.

Miss C. W., aged thirty-one years, never married, a teacher by occupation, was the subject of a backward displacement of the uterus. In August, 1899, she applied to

a physician for treatment, and a metallic pessary of the Hodge pattern was inserted. I have not seen the pessary that was used, but received my information upon this portion of the history of the case from the physician who applied the pessary and who referred the case to me for operation. The pessary was placed on a Thursday, and the patient returned to her home, some thirty miles distant from the physician. On the second day the patient began to suffer pain, which increased day by day, and when examined by the physician on the Monday following the pessary was found protruding into the rectum, and was removed per anum. When the patient was referred to me, on October 6th, there was an opening in the rectovaginal septum just above the anal sphincter, of oval form, that would readily admit the end of the little finger. The operation consisted of divulsion of sphincter, separation of the vaginal mucous membrane, freshening the edges of the fistula and suturing with Lembert sutures of catgut the rectal portion of the fistula, gliding and suturing the vaginal mucous membrane. Union was prompt and perfect, and the patient is now quite well.

DISCUSSION.

Dr. T. J. Crofford, of Memphis, Tenn.—I wish to relate a case of rectovaginal fistula which came under my observation a few months ago. The patient was married, thirty years of age, had never borne children. She had never been pregnant; she did have some hemorrhoidal trouble. A surgeon dilated the rectum and made one or two applications. She had an abscess in the perineal body, and it came through the vagina. Some months later she fell into my hands. I mention this merely as a cause coming from a source we would hardly look for. I will mention the method I pursued in treating the case, it being a little different from the excellent plan detailed by the essayist. I washed out the sinus at intervals for quite a while until I destroyed the acute sepsis in it, and then the patient was prepared in the usual way for operation: First, I dilated the rectum thoroughly, stretching the sphincter. Second, I dilated the

fistula, being careful not to tear it. Third, I painted the inside of the fistula with tincture of iodine, so as to make it dark in color. Fourth, I cut the perineum below the fistula, converting it into a complete laceration. Fifth, I trimmed away all of this dark tissue, for I could see the parts which had surrounded the sinus and distinguish them on account of the staining by the iodide. Sixth, I stitched the mucous membrane of the rectum with catgut, converting it into a condition similar to an incomplete tear, and then repaired it in the usual way by suture.

Dr. George Ben Johnston, of Richmond, Va.—Some fifteen years ago I was asked to see an elderly woman, seventy years of age, who was the inmate of an eleemosynary institution in the city of Richmond, and who at the time of my visit was suffering from symptoms of fecal impaction. She had been treated by the Sisters in charge of this institution with ordinary purgatives without avail, and upon my first visit I made an examination of the rectum and found a mass as large as a hen's egg. It was roughened, and seemed to have an incrustation upon it, and after a good deal of difficulty I succeeded in delivering this mass through the anus, having dilated the sphincter to accomplish it. I removed a considerable mass of hardened fecal matter, and in so doing discovered that the whole rectovaginal septum had been destroyed. The opening was large enough to admit the passage of an ordinary hen's egg through it. I was anxious to determine what this ball was, and after washing and scraping it discovered it was a large ball pessary, one of the old-fashioned glass globes that was used. This pessary was introduced thirty years before; she had forgotten that it had ever been introduced, and it gave her a great deal of comfort; it had not been removed for the period of time elapsing between the day of its introduction and its passage through the rectovaginal septum. The early symptoms were those of a profuse leucorrhœa, which after a while became purulent, but which attracted but little attention until symptoms of impaction came on or obstipation, which was not relieved by the administration of ordinary cathartics. This woman was very feeble, and her condition so lamentable that no surgical attempt was made upon this fistula with a view to closing it, so that within a few months she died of exhaustion. The peculiar feature of the case is that

she should have worn a pessary for such a number of years, forgetting it, and that it should have become incrusted, leading to irritation, then perforation, and its escape into the rectum, and after reaching the rectum could not be expelled by any ordinary attempt at evacuation of the bowels.

Dr. R. S. Cathcart, of Charleston, S. C.—I saw a colored woman about two years ago who had been pregnant, but gave no history of injury, who had a rectovaginal fistula, and when my attention was called to gas passing through the vagina I found on examination a small fistula. There was some erosion and considerable granulation. I kept the patient under observation for a considerable time, doing what I could for her, with the hope of performing some kind of operation, but she disappeared. I mention this case to show that probably there had been a specific ulcer which had healed spontaneously, the granulation tissue being so close that it united in some way. No operation was done.

Dr. George H. Noble, of Atlanta, Ga.—While these cases of foreign bodies entering the rectum from the vagina should not be overlooked, it is well to bear in mind that the majority of fistulæ are produced from the rectal side, either as the result of syphilitic stricture or of foreign bodies in the rectum. There are quite a number of cases on record in which foreign bodies have remained in the rectum from six months to twenty years. One came to me from the southern part of Georgia, where the patient had carried a mass larger than a goose egg for over thirteen months. It was fecal matter, incrusted with calcareous material, and was easily removed. Pieces of wood, bones, pins, and many other foreign bodies have lodged in the rectum and ulcerated through into the vagina, with resulting rectovaginal fistulæ. In fact, an exceedingly small number are produced by causes acting from the vaginal side.

It was my hope that the essayist would give us some means of curing old fistulæ that accompany syphilitic strictures. We have a stricture high up in the rectum, with ulceration above it, and a fistula running down the rectovaginal septum, entering the vagina at the posterior commissure. These cases are not uncommon, yet they are extremely difficult to manage. I was therefore in hopes that Dr. McMurtry would give us a better method

of curing these cases. I had one not long ago that required sections through the stricture high up above Douglas' pouch, with trimming out of the fistulous tract, closure of the perineum, etc. Fortunately the woman recovered, but I should not expect success by this method of treatment in most of the cases.

For small fistulæ or direct communications between the rectum and vagina without long sinus or fistulous tracts, flap splitting must be an exceedingly easy and desirable method. It possesses the virtue of being free from the necessity of splitting the perineum and subsequent closure. It practically places the simple rectovaginal fistulæ on a par with those in the vesicovaginal system.

Dr. W. D. Haggard, Jr., of Nashville, Tenn.—About two weeks ago I had a case of stenosis from an inflammatory stricture some inches up the bowel, which was curetted through the proctoscope with reflected light, and dilated. The fistula from below the stricture opened into the vagina. It was laid open quite freely. The whole perineal body, the sphincter, and posterior vaginal wall was cut through. It was closed up, as Dr. McMurtry has said, like an ordinary complete tear of the perineum. I did it with silver wire.

One never thinks of this subject without reflecting on the wonderful work of Sims and Emmet in this line, and I am reminded of one case in particular of Emmet's in which the whole posterior vaginal wall was destroyed up to the cervix and down to the sphincter. He did a most ingenious operation, and you all know how difficult it is in this class of cases to expose the edges of the fistula, inasmuch as you cannot, even with the speculum, expose very much. He pared the one edge of the enormous opening without the aid of sight, simply by touch alone, one finger in the rectum and the index finger of the left hand guiding the scissors, the edge of the fistula being drawn down by tenacula in the hands of an assistant. It required two and a half hours to do the operation, and the incisions were closed by silver wire suture crossing the vagina transversely, going up into the lateral fornices, making a common centre of the cervix uteri. It takes a thoroughly skilled plastic surgeon to deal with these cases, and there is no class of cases more distressing. The topic, therefore, is one of practical importance to come before this Association.

Dr. J. Wesley Bovée, of Washington, D. C.—I agree with Dr. Noble that most cases of rectovaginal fistulæ are produced by trouble behind the septum. I believe also that syphilitic and tuberculous strictures are the most troublesome we have to deal with. A patient comes to me once or twice a year from the State of North Carolina to undergo an operation for a rectovaginal fistula. I close it up, she goes home, and at the end of about six months or a year I get a note from her, asking me to engage a room for her at the hospital, saying that she is ready to return to have the fistula closed again. I operate on her again and close the fistula; I get these letters and do these operations with uniformity on the same patient. I agree with Dr. McMurtry that an operation should be done in the majority of these cases, where we know that the lower part of the septum is converted into a condition similar to that which we have in complete laceration of the perineum and the tissues brought together as in the Tait operation. The Tait perineal operation is exactly the same as the Emmet, except that we denude the mucous membrane after we bring the parts together rather than before we do this. That is the only difference. The sutures take up the same tissues, and we remove exactly the same mucous membrane or scar tissue. I would also suggest in these cases doing what Dr. Kelly suggested last year, which some of the members thought was new—namely, closing the sphincter with sutures. I do this with catgut, being perfectly satisfied with it for a buried suture and for plastic work. These fistulæ can be closed high up in the vagina without the aid of a speculum. The work can be done by the sense of touch, as Dr. Haggard mentions Dr. Emmet doing it. It is not at all difficult to pare the tissues and suture them without the aid of either a speculum or of sight. We should dilate the sphincter in all of these operations or else drain. One of the nicest little additions to the technique of this operation is the use of a small rubber tubing that Dr. Pennington, of Chicago, has devised for draining the rectum during or after these operations. This tubing consists of very thin, soft rubber, which encircles the ordinary rubber drainage-tube, made of any calibre you wish, and between the tubes is packed sterilized gauze. It affords thorough drainage of the rectum. It prevents tearing through the sphincter and subsequent perforation through the line of incision above it.

A CASE OF OSSIFICATION OF THE UTERUS.

By C. Jeff. Miller, M.D.,
New Orleans, La.

The occurrence of osteomata in parts and organs of the body that have no genetic relations within the skeleton is quite rare. They usually differ very much in structure from the osseous tumors connected with the skeleton. The Haversian canals are usually absent, and there is a lack of uniformity in the arrangement of canaliculi. In some instances, however, the tissues present all the characteristics of normal osseous structure, and are indistinguishable from the exostoses commonly met with. Specimens of heterotopic osteoma have been removed from various parts of the body. Senn[1] alludes to a case reported by Fleischer of an osteoma of the tendon of the ilio-psoas muscle in which the Haversian canals and medullary tissue were arranged in the same manner as normal bone. In another instance the tumor was situated upon the inner surface of the dura mater. Lesser has described an osteoma of the lung which presented all the histological elements and arrangement of normal osseous tissue. Virchow has also found in the apex of the lung an osteoma, but the Haversian canals and medullary spaces were absent.

There are two methods by which osseous tumors can be developed. The first is by a simple transformation of connective tissue. According to Senn, the connective tissue at the seat of tumor formation becomes more vascular, which leads to active tissue proliferation. This proliferated tissue finally

[1] N. Senn: Surgical Pathology and Treatment of Tumors.

becomes transformed into hyaline masses, in the interior of which bone cells develop. The hyaline lumps become coalescent and undergo calcification. The majority of osteomata are found in parts or organs abundantly supplied with connective tissue, a fact in keeping with the long recognized capacity of such tissue to produce bone. The other method is by displacement of osteogenetic matrices into tissues having no relation with the skeleton. Senn states that such osteomata are usually found in close proximity to a bone, and show imperfect development of the tumor tissue. The specimen presented with this report is not one of simple calcification. All the histological elements and their arrangement show it to be a true osteoma. Whether it is a result of simple connective tissue proliferation, as Fleischer showed his cases to be, or an instance of displaced osteogenetic matrices has not been decided. Its close proximity to the sacrum would favor somewhat the theory of displaced mesoblastic cells. On the other hand, it was situated in parts abundantly supplied with connective tissue, and the intense congestion incident upon the attempt of nature to establish the menstrual functions certainly furnishes the increased vascularity mentioned by Fleischer as the primary step in formation of osteomata from connective tissue. A thorough review of the *Index Catalogue* of the Surgeon-General's Office and of the *Index Medicus* shows that six cases of ossification of the uterus have been reported, the first in 1759, the last in 1852.

The case upon which this report is based occurred in the private surgical work of Dr. E. S. Lewis, whom I assisted at the time.

A girl, aged sixteen and one-half years, of robust appearance and unusual development for her age, was brought by her mother to consult Dr. Lewis in reference to the nature of occasional paroxysms of pain in the hypogastric region and the cause of the delay in the establishment of the menstrual function. She was an active girl, who had spent her life in the country, enjoying all the benefits of out-door life and hearty exercise. Until the time arrived for the establish-

ment of the menses her health had been perfect. When about fourteen years of age, however, she began to experience the usual unpleasant phenomena constituting the monthly molimen—viz., headache, backache, a feeling of weight and heaviness in the pelvic viscera, and general nervous excitement. These nervous phenomena gradually increased in severity and recurrence, partly, perhaps, on account of the rapidly developing plethoric state, which was quite marked. The duration of the pain also increased from the few days experienced in each month to almost a constant aching and weight in the lower abdomen. Backache had been especially annoying. It was described as a boring, pressing pain, which radiated down the thighs, and was greatly aggravated by physical exertion. There had been no disturbance of the bladder or bowels.

The history of the case, in conjunction with the unusually good physical condition, strongly suggested some obstruction in the genital canal. The periodicity of the pain, lasting a regular number of days, followed by a state of rest and comparative ease, pointed to either hæmatocolpos or hæmatometra. Upon attempting to make a vaginal examination it was found that either atresia of the introitus vagina existed or that the vagina was absent. The vulva appeared normal, though the labia majora and minora were much below the average in size and seemed to be flattened out. The vestibule was shallow and narrow, but the mons Veneris was provided with a normal growth of hair. A rectal examination disclosed the entire absence of the vagina, and also the cord of rudimentary connective tissue usually found in such cases denoting the line of faulty development. High in the pelvis, however, a mass somewhat larger than the normal uterus was detected, which presented some peculiar characteristics. One portion of the mass was of oblong shape and unusually hard, while the other seemed about the consistency of soft myomatous tissue. No collection of retained menstrual fluids could be detected. Dr. Lewis advised the establishment of a vagina and exploration of the pelvis, hoping thereby

to find the uterus and complete the genital canal. This he attempted, but after dissecting through the peritoneal tissues to the depth of four or five inches the parts presented such anomalies that further interference by this route was abandoned. It was then decided to make an exploratory laparotomy, but as the patient had not been prepared for section, the newly-formed vagina was packed with gauze, and preparation for further procedure made during the following three days. The abdomen was then opened, and the pelvis explored. Occupying the site of the uterus and appendages was a mass, considerably larger than the normal structures, entirely enveloped in peritoneum and attached by broad ligament support only on one side. The position of the tumor was slightly higher in the pelvis than a normal uterus. It was not firmly attached by its supports, but possessed a certain degree of mobility, much less than that allowed by the normal ligaments. A thorough examination of the growth failed to show either ovaries or uterus, and it was decided to remove it entirely. This was accomplished without great difficulty by tying off in mass the short fold of broad ligament tissue which secured it. The parts were exceptionally vascular, and presented some bleeding-points rather tedious to deal with. The post-operative history was uneventful. The abdomen was closed without drainage, and she rapidly recovered. A macroscopical examination of the tumor soon after its removal showed it to be quite an interesting specimen. Whether it was a tumor involving the uterus and appendages or a congenital malformation of these organs, as in the instance of the vagina, was difficult to decide. The mass weighed 168 grammes. Its general outline was irregularly triangular or pear-shaped, the base being directed upward and measuring three and one-half inches. The length was slightly over three and one-half inches. The thickness varied from an inch to an inch and three-quarters. A smooth peritoneal fold enclosed the entire surfaces except along the right side, where its attachments had been severed. A slight sulcus running vertically a little

to the right of the median line divided the mass into two unequal parts, the left being the larger and composed principally of connective and fibrous tissue and numerous blood-vessels. In the left upper corner near the base, a cavity, corresponding to a Fallopian tube and containing about an ounce of a grumous fluid, was found. Its walls were smooth and had the glistening appearance of serous membrane. Upon the outer border of the wall of this cavity appears a short, round stump of dense fibres, which terminates in a tissue resembling tubules or ill-developed fimbriæ. Another thick fibrous mass winds along the lower wall of the cavity and resembles an inflamed Fallopian tube doubled upon itself. To the right of the cavity and separated from it by a fibrous wall was found an osseous tumor embedded in the mass and enveloped in a thin, tough fibrous capsule. The dimensions of this pear-shaped osteoma are almost identical with those of the normal uterus—viz., two and three-quarter inches in length, two and one-half inches wide, and one and one-eighth of an inch thick. The smaller end, or that part of the bony structure corresponding to the cervix, was composed of a liver-colored tissue which cut easily, but was quite tough, and seemed to lose itself in the bone substance proper. The osteoma was not considered bone when first removed. The appearance of the structure led Dr. Lewis to believe that the growth was a specimen of congenitally displaced kidney in which a large calculus had formed. The specimen was presented to Dr. O. L. Pothier, pathologist of Charity Hospital, who made a microscopical study of the soft structures. He failed to find kidney structure, but instead found ovarian, Fallopian, and loose connective tissues, together with abundant bloodvessels. This disposed of the supposition that the growth was a congenital kidney with a calcareous deposit in it; but still believing the hard mass to be a stone connected with the urinary tract, it was then considered a product of the remains of Gaertner's duct or the Wolffian body in the broad ligament. A review of the literature upon this subject revealed various instances of calculi found in the

Base of Tumor.

1. Shows tissue resembling ill-developed fimbriæ.
2. Is the base of the osteoma.

Posterior View of Tumor, with Sulcus Dividing the Soft Structures from the Osteoma.

3. Denotes part of osteoma corresponding to cervix.
4. Soft structures in which Fallopian tube and ovarian structures were found.

uterus, Fallopian tubes, and broad ligaments, the uterus being the most frequent site.

The supposed stone was submitted to Dr. Otto Lerch, assistant to the chair of chemistry of Tulane University, Medical Department, for a chemical examination, in order to determine whether it was a product of the urinary tract or simply a case of calcareous degeneration of some organ or tumor. It was found to be composed throughout of compact bone structure, which, when decalcified and examined microscopically, proved to be an osteoma presenting all the histological elements and arrangement of normal bone. The point of special interest in regard to the tumor is its origin and the tissues possibly involved. Whether it is simply a growth resulting from connective tissue metamorphosis, displacement of osteogenetic matrices, or ossification of some organ has not been positively determined. The vagina was entirely absent and the ovarian and Fallopian tubes structures not recognizable without the aid of the microscope. Whether the uterus alone developed and underwent these changes is difficult to decide, but the position of the growth, its dimensions, and exact resemblance to that organ gives every reason to believe it to be a case of ossification of the uterus.

THE SURGERY OF BILIARY CALCULI.

By William D. Haggard, Jr., M.D.,
Nashville, Tenn.

I shall restrict my remarks to the surgical aspect of biliary calculi, as a consideration of the causation, frequency, symptoms of the various phases, their diagnosis and discriminating diagnosis, wide-spread complications, prognosis and medical treatment, so called, would lead me far beyond the limits of a thesis of this character.

It may not be amiss, however, in describing the surgery of the gall-tracts, to allude to the very great frequency of gallstones, as most all organic diseases of the biliary reservoir and ducts are directly or indirectly dependent upon them. The frequent findings of unsuspected gallstones at autopsy, however, is not a valid contraindication to operation in cases which, from certain complications, menace well-being and perhaps life.

The causation has been held to be the stagnation of bile with an altered condition of the epithelium, forming both the nucleus and media for their development and resulting from the various mechanical, diathetic and inflammatory conditions. It is to the latter, perhaps, that we may look for a simplification of the various existing etiological hypotheses. The element of infection of the biliary ways in the production of gallstone is an undetermined quantity. It may be stated that Mignot produced cholelithiasis by the injection of bacteria into the gall-bladder.

The supreme *symptom* is pain, and occurring in the right hypochondrium is always significant. It may vary from slight

discomfort to the agony of a biliary colic, which is only equalled by the parturient effort. It is important to discriminate between the intermittent and paroxysmal pain in biliary concretions from the continuous pain in the inflammatory, infective, and suppurative conditions of the biliary passages.

In connection with the diagnosis I wish to strongly emphasize that jaundice is not an essential sign of gallstones, and the practice of waiting for icterus as a confirmatory evidence of their existence is illogical and positively hurtful. Jaundice is a symptom common to the whole biliary tract, whether from inflammation, retention, or obstruction. While in the latter jaundice is inevitable, it is also commonly present from extension in simple catarrhal duodenitis. Hunter McGuire[1] says: "According to my observation, at least one-half of the cases of gallstones are never attended by jaundice, and at least one-half the cases of persistent jaundice are not due to gallstones."

I should like to speak also of the cholangeal inflammations, and also the suppurative and infective conditions, and their differentiation from lithiasis, but it cannot be treated within the scope of this paper, except to call attention to these conditions as being a frequent concomitant and resultant of gallstones, and to urge the early removal of troublesome cholelithiasis in the light of its inflammatory and ulcerative possibilities as well as its undoubted causal relationship to malignant disease thereabouts.

The relatively small number of operations compared to the undisputed frequency of the disease indicate that they are either overlooked, fail to give rise to serious trouble, or the symptoms are mistaken for other disorders. The actual mortality is not known, as it is ofttimes a vague and undetermined malady, and when grave is frequently considered only in the light of the complicating conditions. In regard to the surgical mortality, however, sufficient evidence has accumulated for us to draw convincing conclusions.

In the past eight years Kehr[2] has done 307 operations for cholelithiasis (255 women and 52 men). The total mortality

was 11.7. Excluding deaths due to the pathological conditions, as hopeless carcinoma, advanced suppurative condition, the actual mortality is 3.8 per cent.

Mayo Robson, in the London *Lancet* for May, 1897, gives the following indications for surgical operation upon the gall-bladder or biliary passages:

"1. Recurring attacks of biliary colic, with or without jaundice, and whether the gall-bladder is enlarged or not.

"2. Enlargement of the gall-bladder, whether there be pain or not.

"3. Persistent jaundice, which was preceded or accompanied by pain in the region of the gall-bladder, with or without paroxysms resembling ague.

"4. Empyema of gall-bladder, or peritonitis in gall-bladder region.

"5. Abscess in region of gall-bladder.

"6. Rupture, fistula, or wounds of gall-bladder."

The lessened danger of hernia in this region makes amplitude of exposure the sole consideration.

In tumefaction, linear incision over prominence is all that is required. For exploration, a small vertical incision through skin, fascia, and peritoneum can be made at the outer border of the right rectus, beginning at the top of the tenth costal cartilage. This can be prolonged downward to any needed length and joined by another incision at right angles to it and across the rectus muscle, to give a liberal exposure of the sub-hepatic space (Abbe).

Somewhat the reverse of this triangular incision is proposed by Czerny: Beginning in the median line and prolonged transversely to the right at the level of the umbilicus.

The oblique or transverse incision of Courvoisier, parallel with the lower border of the ribs and one-half inch below it, is capable of easy extension and gives adequate room for manipulation.

Bevan employs an S-shaped incision, for which is claimed most liberal exposure.

Of the operations on the gall-bladder I shall discuss cho-

lecystotomy, cholecystendesis, modified cholecystotomy (without suture), and cholecystectomy.

CHOLECYSTOTOMY. Incision of the gall-bladder and suturing the cut edges to the parietal incision, with drainage.

Like many important life-saving surgical procedures, this operation is of American origin, being first performed by Dr. Bobbs, of Indiana, in 1867. It is the simplest of the gall-bladder operations, and it is most applicable to the majority of cases, and the mortality is practically *nil* in cases without jaundice. In 115 cases Mayo Robson[3] lost five; three were complicated with cancer and two with infective cholangitis and jaundice. Excluding these there were no deaths in 100 uncomplicated cases.

Technique. The usual vertical incision three inches downward from the tip of the tenth costal cartilage usually exposes the gall-bladder. If adherent, as the result of previous severe or existing inflammation, it should first be freed from neighboring viscera. The next and most important technical step is the complete and careful surrounding of the gall-bladder with sterile gauze, so disposed as to entirely wall off the field of operation from the peritoneal cavity. It is convenient to introduce two stout silk ligatures into the fundus to act as guy-lines. The contents may then be aspirated and the incision made for exploration with the finger. Calculi may be removed with the finger, forceps or scoop. After all the discernible stones are extracted the operator should make a careful palpation of the ducts. If any stones are detected they should be removed by the appropriate manœuvre. The edges of the gall-bladder incision are then sutured to the peritoneal and fascial margins of the wound by chromacized catgut. A non-perforated rubber drainage-tube is introduced and the parietal wound partly closed by sutures. Copious dressings should receive the bile, or it may be siphoned into a bottle by rubber tubing. At the end of ten days the bile may be dammed up by a pad, and the opening usually closes in three or four weeks. If a sinus persists there is usually a stone embedded somewhere in the biliary tract, but many stones overlooked or left work out later.

Fistulæ resulted in fifty per cent. of Robson's cases where the gall-bladder was sutured to the skin, but in only seven out of 160 cholecystotomies, where it was sewn to the aponeurosis, all of which were ultimately cured by appropriate means.

The earlier operations and a certain number are done now in two stages. It avoids the risk of peritonitis, especially in the infected cases. It is much simpler, and should commend itself to the inexperienced operator. To the expert it is less often required. Kehr used it only three times in 100 cases. In acute cholecystitis where the gall-bladder is small and deeply seated and cannot be satisfactorily sutured to the incision, Riedel advocates the two-stage method, by allowing adhesions to form about a gauze tamponade, before incision into it. The chief objection to the operation in two stages is that an impacted stone in one of the ducts could not be removed and might require a second operation.

Cholecystendesis. Immediate suturing of the gall-bladder after incision and extraction of the stone was first suggested by Langenbuch[4]. It is requisite that the bile-channels be open. It is the ideal operation in that it leaves no biliary fistula, but it presents the danger of peritonitis from leakage, prevents needful drainage of the inflamed tracts and walls of the cholecystis, and also cuts off the escape of any remaining concretions. It should be reserved for early cases with slight inflammatory changes. Two rows of Lembert sutures are required.

A modification of cholecystotomy by Poppert, of Giessen, has recently been described and quoted by Coley[9] in an interesting *résumé* in *Progressive Medicine*, June, 1899, as follows:

"The first steps of the procedure recommended by Poppert are the usual ones—namely, the incision of the gall-bladder and removal of the calculi; then, however, instead of directly suturing the bladder to the abdominal wound, he establishes between the two a narrow drainage by means of a thick and long drain, which is fixed by a suture in the lowest point of the incision in the bladder, and the lips of the wound are

drawn as tightly as possible around it. The other end of the drain is sutured to the abdominal wound and is surrounded by a wick of iodoform gauze, which at the same time serves as a dressing for the bladder incision. The bile flows out through this tube of caoutchouc. In ten to fifteen days the obliteration of the bladder around the drain ceases, as is shown by the fact that the bile impregnates the wick and soils the dressing. At this time, however, the adhesions having been formed around the drain, there is no longer any danger of the bile escaping into the peritoneum. Then the iodoform wick can be taken out, and at the end of from three to four weeks the drain is removed. The fistula closes rapidly.

"The author has practised this mode of drainage in forty-seven cases of simple cystostomy, and in ten cases cystostomy combined with a cysticotomy or a choledochotomy. He has never had a failure, and claims the following advantages for his method:

"1. It is extremely simple, and may be practised in all cases where the bladder is distended or contracted. The method can be employed even in friable bladders—which heretofore have been considered as unfit for operation—and even in worse conditions.

"2. It does not cause the formation of tight adhesions between the bladder and the abdominal wall, and does not cause any painful contractions of the bladder and great biliary canals when the bladder and liver resume their places.

"3. It affords protection against peritonitis, for as the bile flows out of the cystic wound it is absorbed by the tampons. The tamponade becomes particularly valuable when it is necessary to open an abscess situated above the bladder.

"This also has been done by many American surgeons, and cases reported by Longyear, of Detroit, and Hall,[11] of Cincinnati, in 1893."

Cholecystectomy. Excision of the gall-bladder, first performed by Langenbuch, 1882. It is regarded by Thiriar as the least dangerous of the operations on the gall-bladder. Its indications may be summarized:

1. As a secondary operation for persistent mucous fistula, as a result of insuperable obstruction of the cystic duct (Robson).

2. When the gall-bladder is contracted and can with difficulty be brought into the incision, extirpation can be practised if the common duct is undoubtedly free.

3. Where the friability of the organ from inflammatory disorganization precluded other indicated procedures.

4. Malignancy, gangrene, and ulceration.

The operation is anatomically of the simplest sort, requiring only blunt dissection of the attachment to the liver and ligation of the cystic duct, followed, or not, by drainage. The portion attached to the liver in a necrotic gall-bladder was left by Gaston, and the remainder trimmed away after ligation. Dr. Clinton Cushing, in a paper read before the last meeting of the American Medical Association, in the Section on Obstetrics and Diseases of Women,[15] took the position that the gall-bladder, being absent in certain animals, the horse, the deer, and elephant, was probably like the appendix, a vestigial organ, and could be removed without detriment to the physiology of the economy. That, being a cul-de-sac, serious disease once occurring was likely to return. He advocated excision in all cases of operation for gallstones, save obstruction, to prevent reaccumulation or renewal of inflammation. He reported six cases, all recovering.

On the contrary, Rose[7] considers the function and retention of the gall-bladder very important, and advocates exploration of the ducts by incision at the base of the gall-bladder, and clearing the tract of stones by that avenue. He found that disablement of the gall-bladder caused compensating dilatation of the other ducts, and the continuance of such disablement or excision of the gall-bladder would lead to new secondary lithiasis in the branches of the hepatic.

The surgery of the gall-bladder is almost perfected, but the management of calculi in the ducts by the various methods is as yet unsettled. I shall discuss the following operations on the ducts :

Cholelithotrity, cysticotomy, choledochotomy and choledochostomy.

CHOLELITHOTRITY, or the crushing of the calculus in the duct, has been said to be preferable to incision. This is accomplished by (*a*) finger pressure, (*b*) pressure by padded forceps, (*c*) needling. The first is the least objectionable, and Robson reports thirty cases with one death. Needling, or breaking the stone into fragments, was suggested by Mr. Thornton; crushing was suggested by Mr. Tait, and is the least of his wonderful work in this field. Both this and pressure by padded forceps have some of the dangers of incision and may present others, such as leaving débris as nuclei for further concretion. They were practised before the surgery of the ducts had reached its present stage of advancement toward perfection. Hence they are infrequently employed at this time.

CYSTICOTOMY. Incision of the cystic duct, extraction of stone with or without suturing. The cystic and hepatic ducts and the upper part of the ductus communis can be reached by an incision through the anterior layer of the gastro-hepatic omentum, the liver and gall-bladder being drawn strongly upward. Cysticotomy is rarely required, and only when a stone is so firmly impacted that dislodgement by manipulation and pressure fail. Drainage should be established with or without suture. Kehr operated on the cystic duct twenty-three times without a death.

CHOLEDOCHOTOMY. Incision of the common bile-duct. Courvoisier estimated that 4 per cent. of gallstones were located in the common duct, but Robson says, from a surgical stand-point, 20 per cent. is not too high. Clayton Parkhill[12] says that stones were removed from the common duct two hundred years ago. Courvoisier deliberately planned and performed the operation of choledochotomy in 1890, but Marcy, of Boston, removed a stone from the cystic duct the year before. The lower part of the choledochus may be reached by cutting through the peritoneum at the right of the first or second portion of the duodenum toward the median line. All

manipulations, and especially suturing of the common duct, are rendered wonderfully more easy, as urged by Deaver,[13] with the finger in the foramen of Winslow, thus elevating the duct in the border of the gastro-hepatic omentum. It can be accurately palpated, and an impacted stone can sometimes be pushed into the duodenum or back into the gall-bladder. The cystic duct can be palpated and also a portion of the hepatic. When the stone is located, linear incision of the duct can be made with the finger behind it, great care being exercised to prevent injuring the portal vein. In all operations on the duct a sand-bag under the back brings it within much easier reach. The feet should be lowered, to allow the colon to gravitate downward, the liver being held up by large retractors. Gauze pads should be snugly packed about the field of operation. Adhesions, which usually exist, should be very delicately severed. If suturing is contemplated it should be done in layers—fine catgut uniting the muscularis, Lembert sutures of silk the peritoneum. Halsted[5] has described minute hammers for elevating the duct and putting it on a stretch to facilitate suturing. It is difficult to prevent leakage by any method, and it is best to drain. If it is inexpedient to suture, the entire efficacy of drainage with gauze has been abundantly proven and its employment ardently insisted upon by W. E. B. Davis, who has made so many important contributions to the surgery of the gall ducts. The importance of this suggestion is well illustrated by a recent report. Quenu[6] collected 95 cases of suture of the ducts, with a mortality of 35.5 per cent., while the mortality in the cases without suture was only 18 per cent. In these were included 6 personal cases. In 2 sutures were used; both died. In 2 others biliary intoxication appeared, the sutures were cut and the patient recovered. The other 2 were not sutured, and recovered. Fenger[8] also believes the common duct should not be sutured, as a rule, and never without drainage both from the site of incision in the duct, and particularly drainage of the gall-bladder, to prevent biliary intoxication. McBurney[14] has suggested opening the anterior wall of the duodenum at the

junction of the first and second portion, and approach the common duct through the intestine. It obviates the difficult exposure and manipulation of the duct by the usual method, gives easy access to the stone by dilatation, and slight incision of the duodenal opening of the duct allows free probing for other stones, greater safety of suturing the duodenum, and more rapid recovery. He has performed the operation six times. Parkhill,[12] of Denver, has made a Murphy button anastomosis between the common duct and duodenum with success, and Robson reports two similar anastomoses, by suture, with recovery.

CHOLEDOCHOSTOMY, or attaching the duct to the incision in the anterior abdominal wall, is rarely necessary, always difficult and sometimes quite impossible. Fenger collected forty-four cases of choledochostomy in 1896, with a mortality of 18 per cent; he had operated on 7 cases with 1 death, 14.3 per cent. Kehr operated on 7 cases with a mortality of 11.7 per cent. Peterson,[9] 20 cases, 4 deaths, 20 per cent.; and Robson, 49 cases with a mortality of 6.1 per cent., jaundice and suppurative cholangitis being present in all of his fatal cases.

CHOLECYSTENTEROSTOMY. Making a permanent fistula between the gall-bladder and intestinal canal by suture or mechanical appliance. It is indicated to short-circuit the bile in:

1. Irremediable obstruction of the common duct from (*a*) stone, (*b*) adhesion, (*c*) angulation, (*d*) chronic catarrhal cholangitis producing jaundice.
2. Persistent biliary fistula.
3. Obstructive jaundice from pressure of cancer.

The first cholecystenterostomy was performed by Winiwater, of Liege, in 1880. He sewed the gall-bladder to the colon and attached both to the abdominal wall. After union had occurred he opened the approximate surfaces and sewed the cut margins together, as we do in making lateral anastomosis by suture. After some five attempts he succeeded. But it was the genius of a Southern surgeon, Dr. J. McFadden Gaston, that gave to humanity the operation of duodeno-

cholecystenterostomy,[16] 1882. It was first performed on the human subject by Terrier in 1889. However, it has only been a safe and generally applicable procedure in the last dozen years. The introduction of that most ingenious surgical device of the age, the Murphy button, has given the operation a much wider scope by its simplicity and the rapidity with which it can be performed. Murphy collected some thirty-eight cases without a death, some years ago, all that had been reported up to that time. A great many have been done since with uniformly good results.

There is a certain class of cases where, owing to the contracted condition of the gall-bladder, or fixity of the duodenum in the depths of the loin, as a result of inflammatory changes, the viscera cannot be made to approximate each other, and the colon may be substituted in that event. While it should be our aim to restore parts to as nearly a normal and physiological condition as possible, still, where it is inconvenient and impossible to switch the bile into the duodenum, one can utilize the colon, as has been frequently done, without detriment to the economy in the supposed necessary presence of bile in the small intestine. This possibility was abundantly proven by the elaborate and carefully conducted experiments by Robson[17] in a case of biliary fistula, which he epitomized in the following conclusions:

1. The bile is probably chiefly excrementitious, and, like the urine, is constantly being formed and cast out.

2. Though the bile probably assists in the absorption of fats, its presence in the intestine is not necessary for the digestion of such an amount of fat as is capable of supporting life and keeping up nutrition.

3. Increase in body-weight and good health are quite compatible with the entire absence of bile from the intestines.

4. The antiseptic properties of the bile are unimportant.

5. Whatever little antiseptic quality bile may have is probably derived from its admixture with the gall-bladder fluid.

6. The supposed stimulating effect of the bile on the intestinal walls is not necessary for a regular action of the bowels.

Colo-cholecystostomy for Chronic Catarrhal Cholangitis with Gallstones.

I beg leave to briefly report the following case: B. J. G., white, male, aged twenty-seven years, had his first severe attack of biliary colic, attended with tenderness and jaundice, in February, 1897. He had had several light attacks of hepatic colic some weeks before, and had been in Johns Hopkins Hospital awaiting operation, but he improved, and it was deferred. He was operated on after the severe attack in 1897, by Dr. J. F. W. Ross, of Toronto.* A number of stones were removed and a fistula made and a drainage-tube kept in for two weeks. The fistula remained open until June, 1897, when Dr. Ross closed it by suture, and the man, who had been in bed the whole of the four weeks, was up in a week.

In November, 1897, he again had a number of attacks of colic and jaundice, which kept up intermittently until March, 1898, when Dr. Louis McLane Tiffany, of Baltimore, opened the gall-bladder, but finding no stones he closed by immediate suture, fixing it to the abdominal wall, and closing the incision throughout.

In June of the same year, while still in the hospital, he was again seized with attacks of colic and transient jaundice, which in the absence of Dr. Tiffany, in Europe, induced his assistant, Dr. I. R. Trimble, to again open the gall-bladder for exploration. He wrote me that he found no stones, but thought he succeeded in passing a rubber catheter through the cystic duct and thence into the duodenum.

The gall-bladder was sutured and attached to the abdominal incision, which was closed by buried and superficial silkworm-gut. On July 3d he received a blow on the skull with a piece of wood in the hands of a drunken assailant, resulting in a

* I have had a communication from Dr. Ross since this paper was read, referring me to a report of the first operation performed by him upon this patient, and the specimens figured in the International Clinics for October, 1897, vol. iii., 7th series. About 3000 gallstones were removed, which were denominated by Ross, and also by Frerichs, "biliary-gravel."

fracture of the skull, which was elevated by Dr. Robert Pillow, of Columbia, Tennessee.

In August, 1899, fourteen months after the third gall-bladder operation, the pain and colic returned, and was rather frequent and more severe than ever before. On October 1st he had a spell that lasted four days, and could obtain no relief from anything. He came to see me in Nashville, and while here had one of the worst attacks of biliary colic I have ever seen. I gave him two and three-fourths grains of morphine (all I had) hypodermatically in less than three hours, without any appreciable effect on the agonizing pains. He was not accustomed to taking morphine, and one-eighth grain after the operation had a very happy and full effect.

On October 12, 1899, in the presence of jaundice which had existed fitfully for two months, I made an exploratory operation through the old scar parallel with the ribs. As the gall-bladder was attached to the parietes it was opened, and a black, tarry fluid was found therein and one single large gallstone, perfectly black and somewhat larger than a cherrystone, together with some smaller crystal-like stones. An effort was made to catheterize the ducts, as had been reported having been done before, without success. The gall-bladder was irrigated and packed with gauze temporarily. It was then dissected from the parietes below, and a careful palpation of the ducts was made, but no other stones could be detected. The adhesions were very considerable, as the result of so many previous operations and such long-continued inflammatory trouble, and the gall-bladder was much contracted. I did not wish to content myself simply with the removal of the two small stones, nor yet I did not want to close it up again or give him another biliary fistula, both of which failed to relieve him permanently. Kelly, Senn and Murphy had all advised a cholecystectomy, but after I found no calculous obstruction to account for the recent colic and existing jaundice, I concluded it must be a chronic catarrhal cholangitis with inflammatory obstruction that came and went. I thereupon deemed it unwise to do a cholecystectomy, and decided to do cholecys-

tenterostomy. The duodenum, however, was so matted with adhesions, and the gall-bladder was contracted to such an extent, that I did not think I could make the anastomosis with safety. I therefore utilized the hepatic flexure and made a Murphy button anastomosis with gauze drainage.

There was no untoward symptom. A little bile came out after the gauze, when it was removed on the third day, but none thereafter, and the drainage tract closed quickly. The jaundice faded, urine cleared up and he had two normal bowel actions a day, whereas, he had previously been taking purgatives daily. He went home at the end of two weeks, with a clear complexion and a gain in weight; has had no trouble since, but the button has not passed.

McGuire reports a button retained over a year in cholecyst-enterostomy, but Treves has never had one to remain in the gall-bladder.

Bibliography.

1. Virginia Medical Semi-monthly, December 2, 1899.
2. Kehr. Volkmann's Klin. Vortrage, October, 1898, No. 225.
3. Mayo Robson. Diseases of the Gall-bladder and Biliary Ducts, 1898.
4. Centralblatt f. Chir., 1887.
5. Bulletin Johns Hopkins Hospital, April, 1898.
6. Revue de Chirurgie, January, 1898.
7. Deutsche Zeitschr. f. Chir., 1898, Band xlix., Heft 6.
8. Annals of Surgery, June, 1898.
9. Progressive Medicine: Surgery of the Gall-bladder and Bile Ducts, page 52.
10. Peterson. Centralblatt f. Chir., 1898, page 145.
11. Transactions of the American Association of Obstetricians and Gynecologists (Discussion), papers by Drs. Davis and Ricketts.
12. Transactions of the Colorado Medical Society, 1899.
13. Journal of the American Medical Association, April 22, 1899.
14. Annals of Surgery, October, 1898.
15. Journal of the American Medical Association, July 29, 1899.
16. Atlanta Medical and Surgical Journal, October, 1882.
17. Mayo Robson. Gallstones and their Treatment, 1892, page 32.

DISCUSSION.

Dr. F. W. McRae, of Atlanta, Georgia.—I do not feel competent to open the debate on this very interesting subject, and while I have had some experience in this line of work, it has not been extensive. I have only seen a few cases. Just in this connection I wish to mention briefly a case which I shall report in

detail a little later. It was one in which Dr. Nicolson assisted me a few months ago. All of the symptoms of cholecystitis were present, and I made a diagnosis of gallstone cholecystitis. The operation demonstrated a very unusual condition. Instead of an enlarged or distended gall-bladder, I found an enlargement of the liver, very hard and nodular, a thing which puzzled me. There were extensive adhesions, and the under surface of the liver was examined with difficulty. I stitched the parietal peritoneum to the surface of the liver, packed it, allowed it to remain for three days, opened the cavity, and removed at various times fifty-eight gallstones, occupying a cavity and pockets in the liver. The adhesions were extensive, but there was no pus. Just a small quantity of dark serous-looking fluid escaped when some of the stones or calculi came away. There is still a small fistula remaining. The patient has gained in weight and now enjoys the best of health. No history of gallstones could be elicited up to six weeks before the operation was performed. The patient said she had only suffered from indigestion and attacks of colic, these attacks not being typical gallstone colic. I have seen a number of cases of gallstones of the ordinary type, but have had no special experience. I have enjoyed the paper of Dr. Haggard very much, and I consider his conclusions in the main correct.

Dr. J. G. Earnest, of Atlanta, Georgia.—I desire to call attention to the symptom of jaundice. Ordinarily this symptom does not appear in these cases of gallstones unless there is obstruction of the common duct. Obstruction of the cystic duct does not necessarily produce jaundice, as you are well aware. There is no bile found in the bladder, but it is simply filled with inspissated mucus, which frequently dilates the gall-bladder to three times its ordinary size. That has been my personal experience. I have seen two or three cases in which the gall-bladder was filled with inspissated mucus, and complete obstruction of the cystic duct, but in which there was no obstruction of the common duct. In those cases in which there was obstruction of the common duct, jaundice was present, while in those of obstruction of the cystic duct, jaundice was not present.

Dr. Hugh M. Taylor, of Richmond, Virginia.—I agree with Dr. McRae, that the essayist has covered the ground so thoroughly

that there is very little left for any of us to say in regard to this subject. I have had a limited experience in cholelithiasis. The essayist brought out one point in regard to the case of cholecyst-enterostomy which is interesting. I had a case of cholecystitis and cholangitis that gave rise to jaundice that had been going on for a month or six weeks. I expected to find cholecystitis from obstruction. I incised the gall-bladder, but found no obstruction to either the cystic or common duct. I could not understand this, and at the time I anticipated malignant disease of the pancreas, but could not find it. I did a cholecystostomy, removed four or five faceted stones to drain the gall-bladder; the patient went on and did not get better. Two months later he was gradually declining. I again opened the abdomen, and after a more careful examination discovered malignant degeneration of the head of the pancreas sufficient to press upon the common duct and produce jaundice.

That case suggests our interest in cancer in connection with cholelithiasis, the two conditions co-existing in fifty per cent. of the cases, it is said. It is interesting to know which is the primary etiological factor of cholelithiasis, irritation from gallstones, opening the gateway for the invasion of cancer, or obstruction producing the gallstones.

One point which has not been alluded to in the discussion is the disadvantage of operating upon cases of persistent jaundice. Jaundice not varying in intensity so frequently means malignant degeneration that the majority of writers whom I have consulted on the subject do not advise operating upon cases in which persistent jaundice is present, because of the frequent coexistence of cancer.

Dr. Manning Simons, of Charleston, South Carolina.—My experience with gall-bladder surgery has been small. I have seen one notable case in consultation which has interested me in connection with the cases that have been reported. In this case the whole gall-bladder was removed. At the time I hunted up the subject, and found there were only twenty cases on record in which the whole gall-bladder had been removed. In my case this tumor was nearly as large as a goose egg, situated just below the ninth rib. Strange to say, there was little jaundice present. An exploratory operation was made and the tumor was found to

be the gall-bladder. The gall-bladder was removed because we found its walls greatly thickened, and in the substance of its walls pus was disseminated. If the gall-bladder had not been removed at the time in this case, and promptly, there would have been extravasation of pus into the abdominal cavity. On removing the gall-bladder we found three gallstones about an inch in diameter, fitting one upon the other, the length of the mass being about the size of my thumb. After removing the gall-bladder, the abdominal wound was closed, and the patient recovered. The operation was done about five or six years ago.

I agree with what Dr. Taylor has said in relation to jaundice being a symptom of malignant disease. I have had occasion to see a number of cases of malignant disease of the pyloric end of the stomach and of the upper portion of the duodenum. and in nearly all of them there was persistent jaundice. I recall a case of malignant disease of the pancreas which was accompanied with persistent jaundice.

Dr. A. M. Cartledge, of Louisville, Kentucky.—I am sorry that I did not hear all of the paper of the essayist, but this is a subject to which we can all devote careful attention. In view of the wide prevalence of calculous disease of the gall-bladder, and the remarkable terminations from operative intervention, and the frequent disastrous results, provided no operation is done, we can well devote a little time to a free discussion of the subject. In an Association like this we encounter strange experiences. For instance, take the experience of Professor Simons. He has operated on twenty cases of perforating wounds of the abdomen, and has only performed one operation on the gall-bladder. This is a singular experience, with all due deference to the doctor. In the past we have overlooked many, many cases of gall-bladder trouble. Sometimes I am asked why I find so many cases of gallstones, and my reply is invariably that given by a celebrated member of this Association—namely, I am always looking for them—and I do not know how better to express it than to say that we will find a number of cases of gallstones if we are constantly on the lookout for them. That has been my experience. Personally, I have very little faith in the colicky indigestions or those characterized by severe pain. When people have pains in the abdomen of sufficient severity to demand narcotics for their re-

lief, I believe there is trouble, as a rule, in the appendix or in the gall-bladder. Take the case of recurrent distention of the gall-bladder. The stone becomes embedded temporarily in the cystic duct, or we have recurrent attacks of cholecystitis with swelling of the duct, the stone never getting down. Such cases are treated for years as cases of indigestion. They have never had jaundice because the common duct has not been involved. I think in my first report on this subject only about 5 per cent. of the cases operated upon have ever had jaundice. We are looking for jaundice, and this symptom is absent in a great many cases. Of course, the diagnosis of calculous trouble, after jaundice is present, is usually easy to make. We should be seeking these cases without the presence of jaundice, anticipating grave symptoms of obstruction of the common duct.

I do not know that my experience has developed anything in the last year of special interest, except to call your attention to one thing, and that is the cholæmic cases. These patients have been profoundly jaundiced for a long time, and these were the cases attended by a high mortality in the beginning of this work. The hemorrhagic cases I feared for a long time, and one such case I had in my unfavorable cases. Profound jaundice has been known to exist from six months to six years in cases of calculous trouble.

In the normal salt solution, preparing these patients from one to two weeks beforehand, we have the greatest triumph. Nearly all of these patients have more or less renal disease, and frequently cardiac changes as the result of endocarditis from the long circulation of bile in the blood, and altogether they are most unfavorable subjects. The tendency to hemorrhage, accompanied with kidney involvement, has made them dangerous to overcome that condition, and I am satisfied we have a wonderful measure in the use of saline solution. If you will pardon me, I will briefly refer to one case which is a landmark in my practice.

In March of the present year I was called to see a gentleman who had been in profound cholæmia for five years. He had consulted many physicians in this country, and I am sorry to say, some of the best men in the East, and I am not saying this by way of criticism. But it illustrates the point that we do not look for and pay enough attention to calculous trouble of the gall-

bladder. There is nothing in modern practice so annoying as to get half a dozen of the so-called best physicians when we have a clear case of impacted calculus, and having them make a refined diagnosis of disease of the head of the pancreas and chronic inflammation of the ducts, etc. It is a reflection on medical science. This man finally went to Europe. He consulted Professor Leyden, who was satisfied that the man had impaction of the common duct with the presence of one or more calculi. A history of the case was taken. Then, I think, von Bergmann saw him and advised against operation. The amount of daily urine excreted was sixteen ounces. The interesting part of the case is that there was a marked heart murmur with pulmonic œdema. He was greatly emaciated ; had had repeated hemorrhages from the bladder and kidney, so that altogether the case was very unpromising. Professor Senn, of Chicago, saw the man with me, and after going over the situation we advised an operation. I was satisfied that the man had calculous trouble. Professor Senn suggested using saline solution, which we did, and in this man's case we increased the urine from fourteen ounces at the time of the treatment up to forty ounces under two weeks' treatment. The arterial tension was brought up, and the man looked entirely different. He was given about half a gallon of saline solution by the bowel daily. He was placed on the operating-table; I removed one stone in the common duct, and found a small contracted gall-bladder containing another. The man made an uninterrupted recovery. He had gained sixty pounds. There was no shock from the operation.

In cases that suffer from long-continued bile in the system and long continued jaundice, etc., we have in the normal salt solution, used either subcutaneously or per rectum, ten days to two weeks (in a bad case three weeks) before the operation, one of the valuable means of overcoming cholæmia.

Dr. J. Wesley Bovée, of Washington, D. C.—This subject brings up the point as to the wonderful things nature works out in her attempts at effecting a cure in the treatment of these troubles. For instance, the formation of an artificial fistula between the gall-bladder and the small intestine and between the gall-bladder and large intestine is what we see in many cases done by nature alone. At autopsies we find a large number of

cases where there is a fistulous opening between the gall-bladder and duodenum at a point about three to four inches below the pylorus, which is the classical location for this fistula. Sometimes the fistula is three inches in length, which is due to the large size of the gallstone passing from the gall-bladder into the small intestine. Sometimes the gallstones in passing through the opening obstruct the lumen of the intestine lower down and cause a fatal obstruction of the intestine. Still larger ones pass through openings made between the gall-bladder and the hepatic flexure of the colon, such as in the operation of Dr. Haggard.

One point about jaundice. The gall-bladder has not the first thing to do with obstruction to the outflow of bile, but jaundice is due to obstruction of the canal in the common duct or hepatic duct, or in branches of the hepatic duct. The gallstone or gallstones may be impacted in the smaller ducts to such an extent as to tinge the mucous membrane or the skin. The calculi, such as Dr. McRae has shown us, go on and form in the liver structure itself. They will form in the smaller branches of the hepatic duct, and they have been found in a number of cases in branches of the hepatic vein itself. Why they form there I am not prepared to state. I simply mention that they have been found at autopsies and at operations in both the small branches of the hepatic ducts and in the hepatic vein.

Dr. Lewis S. McMurtry, of Louisville, Kentucky.—This subject, as has been stated, is a very extensive one. It has occupied the attention of this Association a great deal in the past. I think, Mr. President, that some of those gentlemen who have discussed the paper have wandered from it, inasmuch as they did not hear it when it was read, consequently some of the admirable points that were presented by the essayist have not been touched upon thus far in the debate. I wish simply to call the attention of the Fellows to one particular point that is to be deduced from the paper, and also from the remarks of every gentleman who has participated in the discussion. It is this: In intraperitoneal surgery there is no department where the success of operative work is so conspicuous as in operations upon the gall-bladder in the hands of a skilful abdominal surgeon. The risk of exploring the gall-bladder is so small that it should not deter anyone of skill from doing so. The essayist has narrated a case where the

gall-bladder was operated upon by five different surgeons in the most aggressive manner, beginning with Dr. Ross, of Toronto, Dr. Tiffany, of Baltimore, and ending with Dr. Haggard, and the man has recovered. Certainly here is an instance in which aggressive surgery was thoroughly justified. Take the case that was reported by Dr. Cartledge, in which there was extreme cholæmia continuing for a long time, associated with cardiac and renal disease, either one of which affections is sufficient to deter one from operative intervention, and yet an operation was done with a most magnificent result. So I rise simply to call attention to the point that every lesson taught by operative surgeons in this department of surgery is a continuous call for operative intervention, and so-called expectant and medical treatment are very unsatisfactory. I recall the case of a man who has had successive attacks of gallstone colic for seven or eight years. He has suffered a great deal, and his life has been more endangered by expectant methods of treatment than it ever would have been by an operation for permanent radical relief in the hands of a skilful abdominal surgeon. So the indications in this line of work are conspicuously in favor of operative intervention. Operations upon the gall-bladder are usually safe, even in some of the most extreme cases, while the results of delay are usually disastrous, and all of the experiences accumulated here this morning in this line of work are eloquent pleas for operative intervention.

Dr. George S. Brown, of Birmingham, Alabama.—The essayist only touched incidentally on the question of the infecting agent in cholecystitis, but passed it over as if it was evidently settled, which is true; but I think the general opinion among pathologists is that in the vast majority of cases the typhoid bacillus is most often the infecting germ. In this connection I desire to mention the case of a woman whose little boy had typhoid fever, and she had nursed him for about a week. I was out of the city at about the time she was taken sick, and both of them were removed to the hospital. Her attack began with biliary colic with distention of the gall-bladder. The day I returned a tumor could be felt in the region of the gall-bladder, but it was evidently much smaller than it had been. Pain was relieved, showing that the duct had opened up and the gall-bladder was emptying itself. Two days later the tumor had dis-

appeared; the distended gall-bladder was greatly reduced in size, and there was no doubt about there having been obstruction, because the tumor was very pronounced and as large as an orange. When I first saw the patient they said it was only half as large as it had been, and they were waiting for me to operate. When the tumor went down the woman had a typical attack of typhoid fever; the temperature rose to 101° to 102° during the first week or two. The fever was complicated by a typhoid infection of the gall-bladder; probably the gall-bladder is still infected, and if so undoubtedly she will have recurrent attacks. In studying cases of typhoid fever, I agree with what Dr. Cartledge has said, that it is well enough to look out for these infections all the time. Dr. Bovée saw this patient in Washington about a year before, and when she came to me with a history of pain, etc., and said to me that Dr. Bovée told her that she had appendicitis, it still further complicated matters; and this brings up an important point, that is, the differential diagnosis between gall-bladder pain and the pain of appendicitis. Although no bacteriological examinations were made there is hardly any doubt that this was a case of typhoid fever (contracted from nursing the son) complicated by an immediate infection of the gall-bladder, the earliest, in fact, of which I can find any record. In all probability the attack of appendicitis, in which Dr. Bovée saw her several months before, was altogether independent of this last attack of illness.

Dr. J. Wesley Bovée, of Washington, D. C.—When I saw the woman referred to by Dr. Brown, in consultation, she gave a history of having terrific pain in the region of the appendix vermiformis, with great distention of the abdomen, high temperature, and a rapid pulse. The history was that she was a little better than she had been a few hours before. It was at night that I first saw her. I saw her again the next morning, at which time she had improved very much, her bowels having acted more freely during the night. After this I saw her a few times in consultation and advised an operation when she had gotten over the attack. To all appearances the case seemed to me to be one of acute appendicitis. It would be interesting to know how much trouble the woman has with the appendix, whether she has disease of that organ or not, whether she has typhoid fever

with infection of the gall-bladder, as apparently she did have, and if so, what has been the result of those conditions. It might be possible that I have made a mistake in giving my first opinion, that it was the gall-bladder at fault, and not the vermiform appendix that was involved. Certainly, if it was the appendix, I would expect to find trouble there. February 14. This lady has recently died in a neighboring city of a recurrence and without an operation.

Dr. Haggard (closing the discussion).—I am thankful to the Fellows of the Association for their contributions on this subject in the discussion of my paper. I had felt that it would be incomplete without additional suggestions by Dr. Davis, our Secretary, who has done so much surgical work in this particular field. I rather hoped that his paper would be read at the same time. There were many points that I could not bring out in the short time at my disposal. When I began to work on this subject, in looking over the literature I contemplated writing a more elaborate paper, but it would not have been within the limits allowable by the Association, consequently I had to curtail my efforts and omit certain points that I should like to have touched upon, particularly the differential diagnosis of appendicitis in connection with this subject. One point I should like to make is this, that calculous inflammatory conditions of the gall-bladder are of sufficient frequency to make it justifiable, in fact, incumbent upon us to make a careful examination of the gall-bladder and ducts in every abdominal section. I know that is practised by some, and I personally have had a very practical demonstration of the value of the thorough manner of exploring the abdominal viscera in finding in one case of rather obscure symptomatology a stone in the gall-bladder, which I removed with complete success.

INFLAMMATION OF MECKEL'S DIVERTICULUM, WITH RESULTING GANGRENE OF THE INTESTINE SIMULATING APPENDICITIS.

By William Perrin Nicolson, M.D.,
Atlanta, Ga.

In spite of all the means applied to the investigation of the abdominal contents, and the large degree of certainty with which the diagnosis can be made under ordinary circumstances, yet there remain some conditions that can only be accurately determined when the cavity has been opened. As the acute diseases for which we are called upon to decide in abdominal surgery are, in a large number of cases, due to inflammation of the appendix, all those features which render such a diagnosis complicated have always been of great interest. Among those conditions few have been more rarely encountered than the trouble following the inflammatory affections of Meckel's diverticulum. This remnant of fœtal life is stated by Gray to be present in about 2 per cent. of all bodies dissected, and in these the extent and character of the appendage are very variable. In the majority of cases it remains as a cord passing from the small intestine to the umbilicus, though in many instances it is a large, complete diverticulum, sometimes as large as the calibre of the intestine itself, of varying length and terminating in more or less bulbous extremity. So rare is this condition that so far, in the entire range of medical literature, but a few more than one hundred cases have been reported, and the large majority of these have been found in the dead-room in the

examination following death from intestinal obstruction, and again in operation for obstruction of the bowels, and also for appendicitis. The pathological conditions arising from the diverticulum have been in most cases due to portions of the intestine being entrapped within the encircling cord, where the diverticulum has existed in this form, while in some instances there has been an acute inflammation of the previous tube that has caused adhesion and resulting obstruction. Again, the inflammation seems to have extended to the intestinal tube, causing a paresis of the bowels, especially simulating the latter stage of appendicitis. In a few cases the symptoms and signs have been so much like inflammation of the appendix that a differential diagnosis was not possible. The following case, though not of a typical character, was sufficiently misleading to make it difficult, if not impossible, to make a correct diagnosis. For a full history of the attack to the hour when I saw him I am indebted to his physician, Dr. W. J. Turner, of Ashburn, Ga.

S. B., white, aged twenty years, manufacturer and merchant by occupation, was seized about four P.M., February 21, 1899, with a severe abdominal pain, apparently of the nature of colic. The pain was located principally to the left of the umbilicus. He sought relief by taking some domestic remedy, but, finding that he was not relieved, he called in his physician, Dr. W. J. Turner, who saw him in a few moments. As he had eaten heartily at dinner of some canned goods, the pain was attributed to colic, and a dose of chloranodyne was administered. No relief having been obtained by this remedy, a hypodermatic dose of morphine was given, and soon, being easy, he was sent home for the afternoon. The same evening at eight o'clock he went with some friends to an entertainment, but was taken seriously ill and had to return home. When seen at nine P.M. by his physician he was uncomfortable and suffering from pain and nausea. There had been no movement from a dose of salts given during the early afternoon. His temperature and pulse were normal. Another dose of morphine was given, followed by

12 grains each of calomel and soda, with instructions that in the early morning it should be followed by a full dose of Epsom salts. At seven A.M. on the 22d, there having been no action from the purgatives, two ounces of castor oil were administered, succeeded soon by a glycerin and water enema. The enema was returned unstained. At this time the temperature and pulse were normal, and there was but little abdominal tenderness and slight distention. There was from time to time nausea and vomiting, not severe. During the entire day of the 22d enemata and purgatives were administered without result, and on the 23d a diagnosis of intestinal obstruction was reached, and Dr. Story was called in consultation. The pain, which up to this time had been located to the left of the umbilicus, was now complained of in the region of the right iliac fossa and the appendix. After going over the case thoroughly it was now decided that the obstruction was probably due to appendicitis, though at this time his temperature and pulse still were practically normal. During the day the pulse and temperature began to increase; a hiccough developed, accompanied by more frequent vomiting and a generally grave aspect of the case. Persistent efforts were made by use of salts and enemata to move the bowels, with no result. On Friday, the 24th, I saw the patient at two A.M. and found him in a condition of gravest sepsis, with distended abdomen, intense tenderness over region of the cæcum, with stercoraceous vomiting. Temperature 104° and pulse 155. There was no delirium or disturbance of the nervous system. A diagnosis of appendicitis with general peritonitis was concurred in, and the patient and his family informed that in all probability there must be a fatal issue. As the only possible means of averting this an operation was requested. Assisted by Drs. Turner and Story, operation, Friday, 24th, at eight A.M. Patient was brought to operating-table with a pulse of 160. Incision was made at outer edge of rectus muscle, as for appendicitis. There was marked bleeding from the incision, and when the peritoneum was

reached it was disposed to strip away from the muscle, and behind it there was a very dark color that was explained later. Upon opening the peritoneum a coil of distended intestine, jet black in color, was found crossing the wound at a right angle. The surrounding coils were bound together by lymph. It was supposed that the condition was one of acute gangrene resulting from a violent infection from the appendix, and a search was made for the source of the trouble. In separating the coils of intestine the gangrenous portion presented the appearance of bifurcating into two unequal parts, and these were separated. The smaller, about the size of the thumb, was followed in a direction upward, inward, and backward toward the mesentery, to which its bulbous tip seemed attached by strong adhesion. When this was separated the gangrenous portion of the intestine was easily withdrawn from the cavity, and it was now seen to be the small intestine entirely gangrenous for about seventeen inches, with a blind tube about five inches long springing from the convex border. Both the intestine and diverticulum were distended, full of a black, grumous fluid, and, though the line between the gangrenous and sound tissue was sharp, there was no appearance of any acute constriction. Another coil of intestine that had been in contact with the gangrene presented a gangrenous spot about the size of the thumb-nail, and the omentum that covered it was totally gangrenous. The intestine was resected and joined with a Murphy button; the omentum was tied off, and after thoroughly washing out the abdomen the gangrenous spot was brought up to the wound and well packed about with iodoform gauze, and much of the wound left open. Patient was put to bed in as good condition as when the operation was begun. The vomiting ceased after this, and there was apparently some improvement, but later in the day evidence of increasing failure developed, and he died eighteen hours after the operation. The specimen proved to be a Meckel's diverticulum, inflamed and gangrenous, though there was no evidence of any band constriction and no obstruction in this sense.

Resected gangrenous and distended ileum, with Meckel's Diverticulum attached.

Since all instances of mistaken diagnosis bring a natural sense of humiliation, I have endeavored to ascertain to what extent this same experience has occurred with others. As there is no absolute means of knowing just what person carries a Meckel's diverticulum in the abdomen, it is far more reasonable to expect one suffering from intestinal paresis and peritonitis, with tenderness about McBurney's point, to be suffering from involvement of the appendix. The rarity of the actual presence of the diverticulum has made the report of such cases infrequent, and I have been only able to find six.

Dr. Richardson, of Boston, reports two cases in which he made a diagnosis of acute appendicitis, in one of which, in an operation by Dr. Elliott, "a distended and gangrenous diverticulum" was found; in the second, a successful operation was performed by Mixter (Dennis' *System of Surgery*, vol. iv. p. 296).

C. R. Gildersleeve reports (*Med. News*, lxxii, 392–413): Case of male, twenty-one years old. Taken three days previously with pains in the bowels, continuing all day and growing worse at night. Two enemas were given before movement of bowels was possible. Next day patient was worse, great pain and tenderness near umbilicus and to right of median line. Diagnosis of appendicitis was made and operation advised, but declined. Autopsy showed complete obstruction of ileum caused by Meckel's diverticulum, which had become so twisted upon itself that it was mechanically impossible for its contents to return to the intestine. The diverticulum terminated in a fibrous cord, which formed a complete ring through which the ileum passed.

J. H. Elliott reports (Boston *Med. Jour.*, 1894, vol. cxxx., 586): Case of male, thirty years of age; sick four days with vomiting, chills and abdominal pain. Bowels had moved twice the preceding forty-eight hours. Abdomen distended, tympanitic and exquisitely tender, especially to the right of and below the umbilicus. Free fluid was present in the abdominal cavity. Under ether a large mass was felt in

about the middle of the abdomen just below and slightly to the right of the umbilicus. Diagnosis: Appendicitis. Abdomen was opened by vertical incision two inches inside of the iliac spine. A quantity of turbid fluid escaped. Appendix examined and found normal. On exposing the mass near the middle of the abdomen by extending the incision, it looked like a large, distended and gangrenous knuckle of intestine, but without a mesentery. It sprang from the lower convex part of the ileum, and was lightly twisted at its attachment to the bowel. It extended upward through a mass of adhesion, and when dissected free was found to be attached to the umbilicus. It was then evident that we were dealing with a Meckel's diverticulum, obstructed and gangrenous. It was about seven inches long and the same size as the ileum. Patient, already profoundly septic, died of septic peritonitis the second day.

Guirrard (*Bull. et. Mem. Soc. de Chir.*, Paris, 1898, xxiv., 189): Case of male, aged thirty-six years. Twenty-nine hours previous to consultation patient had been suddenly seized with vomiting and abdominal pains localized upon right side and about umbilicus. Next day his condition worse, stomach and intestine inflated, peritoneal facies. No gas or fecal emission from anus. Three signs of appendicitis being present—1, temperature, 99.2°; 2, tender point of McBurney; 3, zone of dulness in right iliac fossa—this diagnosis was made. Operation for appendicitis, but cæcum found empty. Adhesion of Meckel's diverticulum at its extremity to iliac mesocolon near rectum. Patient died. Autopsy: Diverticulum 23 cm. long, and appearance of umbilical cord of fœtus of six months, pervious in its whole extent. It was folded into small intestine 70 cm. from ileocæcal valve.

W. Mintz (*Deutsch. Zeitschrift f. Chirurg.*, 1898, xlviii., 301). Soldier, aged twenty-four years; previously healthy; suddenly seized with colicky pains after eating, with constipation. Boring-like pains about the navel, radiating toward ileocæcal region, more seldom to left. Hiccough, inclination to

vomit. Distention of abdomen under the lower ribs. Temperature, 96.9°. Pulse, 56. Diaphragm at level of fourth rib, and half-moon shape from retraction of abdominal wall just over navel. No intestinal movement or localized increase of resistance noted. Whole abdomen, and especially over ileocæcal region, very sensitive to slightest touch. Diagnosis made of probable diffuse purulent peritonitis from perforation of appendix. Given ice and opium. Patient grew gradually worse, and six days after died. Autopsy: Diverticulum 80 cm. above ileocæcal valve, 16.5 cm. long. Diverticulum converted into solid band which joined ileum above incarcerated place.

DISCUSSION.

Dr. H. H. Grant, of Louisville, Ky.—I wish to say a word or two about Meckel's diverticulum, although my remarks do not relate to the differential diagnosis between this condition and appendicitis. I have had but one case with diverticulum, and this was encountered in an operation for strangulated femoral hernia in a woman. There was nothing peculiar about the symptoms except that the obstruction of the bowels was not as complete as is usually found in strangulated hernia. The tumor was irreducible; there was a considerable amount of pain in the abdomen, colicky in character, and the symptoms led me to determine that an operation was justifiable, even though the bowels had been somewhat relieved. When an incision was made there presented the long tube of the intestine without any mesentery, perfectly blunt at the end, looking very much as a piece of intestine invaginated when the intestine had been resected and the mesentery stripped away from it. The operation was done in a private house under unfavorable conditions for extensive surgery, and I did not remove the diverticulum. I returned it to the abdomen. It was in a healthy condition; did a radical cure operation; made use of purse-string suture at the femoral opening, and three years have elapsed without the patient having suffered any inconvenience.

I take this occasion also to call attention to a point that has been hinted at, but not emphatically presented, in the remarks

that were made on a previous paper, and it is this: that those conditions developed in making exploratory incisions, some of which are certainly dangerous, should encourage us not to waste too much time in differential diagnosis, but proceed at once to make a laparotomy in order to determine the condition of the patient. I have observed that the reason we do not more promptly and constantly do operations in the abdominal cavity is not because the patients are afraid, not because the practitioner who calls us in consultation hesitates to accept our diagnosis, but because we ourselves are a little too backward to insist upon what we believe to be correct. If we could formulate in our minds the firm conviction and have the courage of it, rarely would the patient or consulting physician hesitate to interfere with the prosecution of the idea, and it is cowardly that we should take refuge behind the want of support by the patient and the general practitioner. It is our own want of courage that allows many an opportunity to pass without doing a life-saving operation, and I regret to say that many patients by our negligence slip into graves that might be rescued.

TWO CASES OF INTRALIGAMENTOUS CYSTS.

By T. J. Crofford, M.D.,
Memphis, Tenn.

Case I.—Miss T., aged fifty years, of Humboldt, Tenn., presented herself at my office on July 1, 1899, with an abdominal tumor. A few days later the abdomen was opened. The tumor was found to be an intraligamentous cyst.

Both ovarian arteries were ligated. The uterine artery was ligated upon the healthy side at as low a level as the internal os. The uterus was cut across. The uterine artery secured upon the tumor side and the enucleation of the tumor proceeded with. The loss of blood was considerable, although the enucleation was made as rapidly as possible.

Several arteries in the broad ligament required ligaturing and one or two deep down in the pelvis required to be secured before the hemorrhage was under control. By the use of hot water and a little time, however, the hemorrhage was controlled. The cavity was obliterated as much as possible by suturing together the two layers of ligament. She recovered.

Case II.—Mrs. S., aged forty-two years, entered my private sanitarium on Oct. 31, 1899, suffering from an abdominal tumor. It was known to have been in existence some months. During the month of June last she experienced an attack of acute peritonitis which came wellnigh terminating her life. The acuteness of the attack subsided, but a chronic peritonitis has existed ever since.

Abdominal section was made on November 6. There were found two tumors, one on each side, developed between the layers of the broad ligaments. The ovarian arteries were

secured near the brim of the pelvis. The tumors which were not of very large size were separated from the uterus as far down as we dared, and the uterine arteries secured as low as it was possible after emptying the cysts. The hemorrhage was alarming at every attempt at enucleation upon all sides. I am thoroughly convinced that this patient would have bled to death before either of the tumors could have been peeled out from their vascular beds. This idea was abandoned. The larger vessels in the broad ligaments and walls of the cysts, which were several in number, were ligated. The upper portion of the sacs were trimmed off and covered as best we could with peritoneum. After the oozing had stopped the abdomen was closed without drainage. She has had an uninterrupted convalescence and returned to her home last Monday.

We of course cannot tell just what the ultimate result will be. I believe these sacs will be largely absorbed and that she will become and remain well.

Two years ago, Dr. Rufus B. Hall, of Cincinnati, proposed a method of ligating both ovarian arteries and the uterine artery on the healthy side. The uterus was next amputated on a level with the internal os. The uterine artery on the tumor side was next secured when he could peel out the cyst from between the layers of the broad ligament with a bloodless result.

This was truly a brilliant application of a known principle of surgery to intraligamentous cysts. We do not wish to detract from this achievement, but desire to call attention to the fact that it is not to be relied upon implicitly; that it will not control hemorrhage in all cases to a safe degree; that in some cases there will be found other vessels requiring to be ligatured before the hemorrhage can be controlled within the bounds of safety.

If we will stop to consider the fact that the blood-supply does not come exclusively from the ovarian and uterine arteries, which are branches of the aorta and the anterior division of the internal iliac respectively, the reason for this failure to secure hemostasis will be apparent.

The anterior division of the internal iliac gives off a superior vesicle which soon furnishes the middle vesicle. Then comes the inferior vesicle, middle hemorrhoidal, obturator, internal pudic, sciatic, and, in the female, the uterine and vaginal. These supply the structures and viscera of the pelvis. In their enlarged condition incident to the growth of one of these tumors they may be a source of considerable hemorrhage. Then, too, the venous plexuses which exist here normally have become increased by the diseased condition, will also furnish a fruitful source of hemorrhage. The uterine artery may give off branches as it pursues its serpentine course between the layers of the broad ligaments, and on the side of the uterus below the point where the ligature is applied may, and usually does, give off branches which may furnish considerable blood to the diseased structures.

The truth of the matter is that some tumors of the broad ligament can be peeled out without hemorrhage. Others will be attended with considerable loss of blood. There are some cases that will die on the table even after the ovarian and uterine arteries have been secured by the method of Dr. Hall or any other method that can be devised. There have been too few cases operated upon by this method to justify deductions too sanguine. The anatomical knowledge of the older operators has not always been at fault.

That the method of Dr. Hall will save some cases that would otherwise die, I have no doubt, but that it will not secure hemostasis in all cases I am thoroughly convinced, for the anatomical reason above given, that the blood-supply under the abnormal conditions does not come exclusively from the uterine and ovarian arteries between the points of ligaturing, especially will this not be a safeguard against hemorrhage in cases like Case II., after an inflammatory attack has been experienced with its resultant adhesions and engorgement and the increased size of the arteries and venous plexuses.

Dr. Hall at a recent meeting of the Association of American Obstetricians and Gynecologists, in Indianapolis, proposed the ligaturing of these four vessels as a safeguard against

hemorrhage in the removal of retro-peritoneal growths. The retro-peritoneal tumor may obtain its blood-supply from these vessels or it may not. Should it happen to obtain it from this source all is well, but should it receive its blood from any other of the pelvic arteries or from these same arteries beyond the point of ligation, this measure will be of no particular value in controlling the hemorrhage.

Retro-peritoneal tumors like intraligamentous cysts can sometimes be removed with slight loss of blood without the ligaturing of these four vessels. There likely are some retro-peritoneal tumors that get their blood-supply from this source. If they do, all is well in pursuing this method, but some retro-peritoneal tumors obtain their blood-supply from other sources, and when they do, of course the procedure of securing these four vessels will be of no avail against hemorrhage.

In the removal of intraligamentous and retro-peritoneal tumors the ligaturing of the uterine and ovarian arteries are valuable as hemostatic measures only, in so far as they supply these growths with blood.

In conclusion, I will say that no one in this Association is more willing than myself to congratulate Dr. Hall upon his brilliant conception. That it is an advance in the operative art I do not question, but that it is of universal application in these two kinds of tumors I deny on anatomical grounds.

The feeling of security against hemorrhage after adopting this plan may cause some one to meet with disaster. These two cases are reported, and this short paper is written in the hope that it may cause us to look to other sources of hemorrhage than the ovarian and uterine arteries.

DISCUSSION.

Dr. J. G. Earnest, of Atlanta, Ga.—The paper of Dr. Crofford has been exceedingly interesting to me. The presence of a large intraligamentous cyst under the old régime was rather appalling to any surgeon. About three months ago I had a case of intraligamentous cyst in my service at the Grady Hospital,

the largest I have ever seen. The cyst reached considerably above the umbilicus, and its contents measured about three and a half gallons. The cyst was extremely vascular, and the question of how best to enucleate it was a serious one. I will speak of the method I adopted. In the first place, I tied the ovarian artery, cut the cyst loose, drew it up into the margin of the wound, emptied it, and attached it to the wound all around, so as to make it secure. I cut the serous membrane down to the cyst proper and began the peeling out process, so that, after having the tumor perfectly secure on all sides, there was no difficulty in applying as many ligatures or hemostatic forceps as were necessary. The tumor was finally removed. There were immense masses of veins and arteries in the connective tissue underlying the serous covering of the tumor. I do not believe there were more than three or four ounces of blood lost during the entire operation. The abdomen was finally closed by bringing what was left of the sac close up into the wound, putting in drainage, and the woman recovered.

Dr. Lewis S. McMurtry, of Louisville, Ky.—The subject presented by Dr. Crofford is one that we can very profitably discuss, and it should not be passed over hastily, because there are Fellows in the Association who are dealing with this class of cases and thinking, possibly, that they are going to meet with simple cases some time. Dr. Crofford should be congratulated on the excellent results he obtained. Both patients recovered, which is a sufficient justification of the technique he employed in the management of the cases, and settles that phase of the subject.

With reference to intraligamentous cysts, and especially the technique of the operation, there are two points about which there may be some misconception. In the first place, when an inflammation has obtained in an ovarian cyst, and extensive adhesions have been formed, it is very easy to be mistaken as to the cyst being intraligamentous. These cysts are not common. I imagine that a great many cases have been reported where extensive inflammatory products have cemented the tissues together, especially the peritoneal surface of the parietal viscera, so as to present the appearance of cysts when it is not so.

The next point is in regard to dealing with these cysts. There

are many operators who adopt certain manipulative methods, and they naturally think there is something new about them ; but if they will observe the work of many other surgeons it will be seen that nearly every operator has certain things peculiar to himself in dealing with complicated conditions. One of the greatest advances in the technique of pelvic tumors, especially the operation of hysteromyomectomy for uterine fibromata, was attained when Stimson, of New York, presented the important point of ligating the uterine arteries. Schroeder failed in his operations just because he disregarded that important point. That was a great advance in the evolution of hysteromyomectomy for uterine fibromata. We find that there has been gradual progress in this work ever since Stimson made that contribution to the operative technique, so that the results of operations are quite as good now as those obtained from the classical operation of ovariotomy.

Dr. Hall deserves great credit for having presented to the profession this method ; but I believe it was used by operators for a long time previously. I saw it used before Dr. Hall's paper was read at the Pittsburg meeting of the American Association of Obstetricians and Gynecologists—namely, to get under the tumor and work up from beneath. Dr. Hall deserves credit for urging its more extended use, and I cheerfully accord him that credit. I think if the President (Dr. Johnson) would give us his views on the subject he would tell us that he has followed the method of getting beneath a tumor with a great many adhesions, and working from below up instead of from above downward, for a long time.

In regard to the main point Dr. Crofford presents, I believe he has been led away from his landmarks, and that the recent grappling with two severe cases has made too deep an impression upon him as to the activity of the circulation in this region. If he will take four ligatures, and ligature the ovarian artery off on the side of the pelvis, make a great scoop with the uterine arteries on each side, and catch the other ovarian artery, he will be able to shell out the tumor there without a great deal of danger. He may encounter vessels that will bleed, but the hemostatic forceps will aid him as he proceeds. If he secures the four great trunks he can proceed with ease, and I do not believe that the collateral

circulation will be a serious barrier to proceeding with the operation of enucleation. I have never seen any cases in which we could not do this; but there will be perhaps one or two small vessels that will require attention as he strips along, but if he gets the four trunks he can go ahead.

Dr. W. E. B. Davis, of Birmingham, Ala.—I believe in a great many of these cases of intraligamentous cyst, that if the cyst is tapped in the early part of the operation and pressure made upon the abdominal aorta, after the cyst is enucleated we can readily control the hemorrhage. The importance of resorting to pressure upon the abdominal aorta is not appreciated very generally by the profession, and I believe in advanced cases of ectopic gestation much can be accomplished by this procedure.

With reference to the evolution of this operation, I think Hall got his idea from a modification of the Baer operation by Kelly. Kelly finds it easier to go in on one side than on the other, and he has pursued that course, going entirely around. So Hall has adopted this method in enucleating these intraligamentous cysts. However, I think you will agree with me that it is not a wise thing to sacrifice the uterus and its appendages, in order to enucleate the cyst, if it can possibly be avoided, and unquestionably it can be in the majority of cases.

Dr. McMurtry.—You mean Dr. Hall adopted the idea of Pryor?

Dr. Davis.—Perhaps Pryor preceded Dr. Kelly in this matter. In solid tumors it may be necessary to remove the uterus in order to take out the tumor; but in the case of cysts, I do not think it is necessary to always sacrifice the uterus.

Dr. Crofford (closing the discussion).—As I said in my paper, I did not wish to attack the work of Dr. Hall. I think his work has been excellent; it is a great advance in surgery, but I am sure that his method will not control hemorrhage in all cases. I am not mistaken about these cysts; they were cysts of the broad ligament, and the arteries were well secured. In the first case the uterus was severed and the uterine and ovarian vessels secured, but there was a great deal of hemorrhage, and we came near losing the patient as a consequence of it. The other case was a double cyst—one of each broad ligament. The tumor could be felt deep down in the pelvis by introducing the finger into the

vagina. When we consider the fact that cysts of the broad ligament come from the unclosed portion of Gaertner's duct or Kobelt's tubules we realize that they are not fed exclusively from the ovarian and uterine arteries. Ovarian tumors frequently destroy the original pedicle by rotation on their axes, yet they receive their nutriment from another source. So it is here, and in inflammatory conditions especially. If the uterine artery should give off branches in between the layers of the broad ligament when it is pursuing a tortuous course—toward the uterus—or should give off branches anywhere before it gets to the point where the ligature is applied, hemorrhage from these branches is to be expected. The ligaturing can only control hemorrhage which proceeds from the uterine artery and the ovarian artery between the points of ligaturing. The other sources remain unaffected and may give free hemorrhage.

As to the similarity of Stimson's work and that of Kelly's in dealing with fibroids, I would say that I operated last Thursday upon a case of fibroid tumor before the class. It was apparently a simple fibroid. Both ovarian and uterine arteries were ligated deep down; a profuse hemorrhage followed from the peritoneum upon the anterior side of the tumor, necessitating the ligation of three or four vessels. Neither is the method which has been advocated by Dr. Hall to be relied upon absolutely, and it was only to combat the idea of implicit confidence that my short paper was written.

EXPERIENCE IN OPERATIONS FOR TYPHOID PERFORATIONS.

By Hugh M. Taylor, M.D.,
Richmond, Va.

It is claimed that we have fifty thousand deaths[1] from typhoid fever in the United States each year.[2] In Philadelphia alone in the first three months of 1898, one thousand seven hundred and thirteen deaths occurred from typhoid fever, and in the same city in 1899, up to March 13th, there were three hundred and sixty deaths from the same cause.[3] In our recent war with Spain and the Philippines there were two hundred and two deaths from bullets, two hundred and sixteen from accidents, and two thousand seven hundred and seventy-four from typhoid fever.[4]

It is further claimed that one-third of the deaths from typhoid fever are due to perforation. One third of fifty thousand is sixteen thousand six hundred and sixty-six. Typhoid perforation is credited, then, with a mortality of sixteen thousand six hundred and sixty-six each year in the United States alone.[5]

One-third of one thousand seven hundred and thirteen, the number of deaths from typhoid fever credited to Philadelphia in three months of 1898, is five hundred and seventy-one; while one-third of three hundred and sixty, the deaths recorded to March 13, 1899, is one hundred and twenty. Is

[1] Pediatrics, N. Y.

[2] Hare. Medical Complications and Sequelæ of Typhoid Fever, p. 23.

[3] Seventy-five thousand, according to the census of 1896. Hirth, Medical Times, June, 1898.

[4] Surgeon-General Sternberg's report, ending June, 1899.

[5] Editorial Medical News, November 11, 1899.

it credible that one city can have had five hundred and seventy-one deaths from perforation in three months in 1898 and one hundred and twenty from the same cause in three months of 1899?

One-third of two thousand seven hundred and seventy-four, the number of soldiers who died in the war with Spain and the Philippines, is nine hundred and twenty-four. Is it possible that four times as many of our troops died from typhoid perforations as from bullet wounds? Is it within he province of medicine or surgery to lessen this great mortality? Few, we think, who have seen the virulent intraperitoneal infection incident to a typhoid perforation will expect a mortality of less than 100 per cent. in the cases treated medically. Surgical intervention, on the other hand, has saved more than one-fourth of the cases operated upon (27 per cent.), and we should recall the fact that many of the operations, as was the case with several of my own, were not performed until the patients were *in extremis*, and in some instances the operation was done prior to the improvements in the technique of abdominal surgery.

One-fourth of sixteen thousand six hundred and sixty-six is four thousand one hundred and sixty-six. If these statistics are even approximately correct, and if surgical intervention is indicated in all typhoid perforations, we have sixteen thousand six hundred and sixty-six cases in the United States each year upon which we should operate; and even if our successes in the future are no greater than they have been in the past, we should save one-fourth of sixteen thousand six hundred and sixty-six, or four thousand one hundred and sixty-six lives each year. We may claim that the surgical world is just beginning its investigation as to the possibilities of surgery in this field, and we share the convictions of those who claim, when every case of intestinal perforation (except the moribund) is operated upon within twenty-four hours, we shall save at least one-third of the cases and possibly more.[1]

[1] Keen. Surgery of Typhoid Fever, p. 319.

It would seem a settled fact that the typhoid perforation is in every instance essentially a surgical complication, and equally so, certainly in the incipiency of its existence, a legitimate field for operative intervention. There is nothing to justify the hope that recovery is possible through any resources other than those essentially surgical.

It is true in exceptional instances recovery has been claimed to have occurred spontaneously.[1] Murchison estimates a mortality of 95 per cent. in those cases "in which general peritonitis supervenes."[2] We believe the cases supposed to have recovered after perforation without operation were mistaken diagnoses, probably a localized peritonitis incident to ulceration without perforation. We grant that very exceptionally a small bullet wound of the intestine may be plugged by a protrusion of intestinal mucosa or sealed by prompt adhesion to some healthy peritoneal surface, but the typhoid perforations that we have seen have been ugly looking lesions. The mucous and muscular coats are destroyed over a wide area, the surrounding intestinal wall is thickened, indurated and friable, and there is to my mind nothing which is likely to occur to prevent the escape of the always fluid fecal contents of the ileum into the peritoneal cavity.

The specialist in surgery appreciates what surgery can do and has done in the treatment of typhoid perforations. The general practitioner, into whose hands these cases commonly first fall, is not so well informed, and this society should express its convictions in no uncertain sound.

It is claimed that one-fifth of the deaths[3] from typhoid fever are due to hemorrhage. One-fifth of fifty thousand is ten thousand. Obviously, if we know that the patient is doomed to bleed to death, it is our duty to open the abdomen and ligate the bleeding vessel in the mesentery or even to excise the bleeding surface. We do not know that the abdomen

[1] Keen. Surgery of Typhoid Fever, p. 218.

[2] Also opinion of Hare, of Philadelphia. Complications and Sequelæ of Typhoid Fever, p. 135.

[3] Medical News, November 11, 1899.

has in any instance been opened with the purpose of checking hemorrhage from a typhoid ulceration. Dr. Keen[1] impresses the difficulty which would attend the locating of the bleeding point, the frequency with which patients recover after profuse hemorrhage, and advises against an operation.

If it is true that we have ten thousand deaths a year from intestinal hemorrhage of typhoid fever, and that these are cases which have not yielded to nature's potent hæmostatic syncope or to such questionable remedial measures as opium, ergot, tannic acid, etc., it does seem that this large number of cases should in some way be brought within the province of justifiable surgery. It would seem just as unsurgical to let these patients die without an effort to save them as it would be in the case of profuse hemorrhage from a gastric or duodenal ulcer or even a ruptured tubal gestation.

But I am reminded that the literature of this whole subject is quite recent and is more familiar to the members of this society than to myself, and therefore even a brief *résumé* of it would be inappropriate.

The purpose of this paper is simply to submit a synopsis of my cases and the lesson they should impart. In detailing these cases I am conscious that I have reiterated symptoms to an unwarranted extent. My excuse is my appreciation of the fact that in this, as in so many phases of abdominal surgery, we need proficiency in diagnosis far more than an improved operative technique.

Case I.—A young man, convalescing from a mild but typical spell of typhoid fever, was taken in the night with sharp abdominal pain, rigors, and vomiting. Recognizing evidences of perforation, I advised an early operation. This was declined until the fourth day, by which time the patient was *in extremis.* On opening the abdomen I found the pelvis roofed off from the general peritoneal cavity by matted bowels. Upon separating adhesions we found the pelvis full of fluid fecal matter, bloody serum, pus, etc., while in the

[1] Surgery of Typhoid Fever, p. 209.

ileum, near the cæcum, there was a great sloughing rent. The condition of the patient was so unfavorable that we felt we were not warranted in doing more than emptying the pelvis and providing for the drainage. The patient died in six or eight hours. This case is interesting because it presented initiatory symptoms, which left no doubt as to the nature of the complication, and also because it showed what nature, even when handicapped by the depression of typhoid fever, can do in the matter of walling in the focus of infection.

By a curious coincidence, a young woman, a next-door neighbor of this patient, was soon afterward afflicted with typhoid fever ; knowing of her neighbor's death and its cause, she made her husband promise that she should not be operated upon. In the second week of her sickness she presented classical symptoms of perforation. An operation was advised by myself and her attending physician,[1] but this young wife and mother was allowed to die without the possible benefits incident to surgical intervention.

Case II.—A second case was not seen until the fourth day after the onset of symptoms of perforation. At that time the distended abdomen, feeble, rapid pulse, and gulping vomiting stamped the existence of acute sepsis. A section revealed general suppurative peritonitis, with fluid fecal matter and inflammatory products in the cavity, and two perforations of the ileum about eighteen inches from the ileo-cæcal junction. The perforations were sutured, the abdomen cleansed, and multiple drainage provided, but this patient died in eight or ten hours. We were informed by his brother (a doctor) that the early symptoms of perforation were characteristic, and a surgeon was promptly called in, but for some reason he advised against an operation.[2] This case is a confirmation of the fact that nature gives us as much time to deal with infection from typhoid perforation as from a duodenal, an anterior gastric, or bile tract ulceration, or even an acute appendiceal

[1] Dr. Edward McGuire.

[2] Dr. Virginius Harrison saw him on the fourth day, and I then saw him in consultation.

infection. It also confirms the common experience that the late operation in all such cases is forlorn surgery.

CASE III.—My next experience repaid me for my previous disappointments. The occurrence of perforation was promptly diagnosed, a successful operation was performed, the fourteenth recovery was recorded, and I now experience intense satisfaction when I see this happy little boy playing on the streets of Richmond. This child, aged about seven years, had been sick with atypical typhoid fever for six weeks. At no time was he seriously sick, and at no time were there either extreme cerebral or abdominal symptoms. The patient was reported to have passed a comfortable night, but awoke complaining of some pain in his abdomen. His mother, thinking he needed it, gave him a teaspoonful of syrup of figs. This, however, was promptly vomited, and several times during the next few hours spells of vomiting occurred. One more attack of sharp pain, which lasted only a short time, was experienced, and after that he insisted that he was all right and had no pain. This was the report given me four hours after the first attack of pain. While the symptoms were strongly suggestive of perforation, the child did not look sick enough at that time to justify such a suspicion. There was no evidence of shock, and those who saw him at the onset of the sharp attack could not say that he was at any time shocked. His pulse was 115; sublingual temperature 101°; respiration was not noticeably thoracic, and his morale was exceptionally good. There was some appreciable rigidity, but there was no distention and no hepatic resonance. An absence of fever for several days, the sudden onset of pain and vomiting, the occurrence of fever, with rapid pulse, plus the abdominal rigidity and abolished peristalsis, was the group of symptoms which warranted the diagnosis of perforation. Per contra, was the sharp attack of pain peristalsis incident to a bowel movement? Was the bowel movement due to acute indigestion and dose of syrup of figs? Was the fever and increased pulse-rate a product of ptomaïne production within the intact intestinal tract? Was the muscular rigidity

voluntary contraction incident to the fear of pain or pain from an irritated peritoneum? It is common experience in typhoid fever to have pain without perforation. Tenderness on pressure, notably in the right iliac region, can, as a rule, be induced, while marked tympanites occurs in about 11 per cent. of cases. Twelve hours from the onset of the alarming symptoms there were unmistakable evidences of serious intra-abdominal trouble. While his pulse had increased to 140, his rectal temperature was reduced to 100.5°. While his abdomen was not painful nor markedly tympanitic, it was rigid, and there was no appreciable movement of gas within the intestines.

I incised over the ileo-cæcal region because of the known fact that a large majority of typhoid perforations are found in the ileum within eighteen inches of the ileo-cæcal junction. On incising the peritoneum, a quantity of seropurulent fluid escaped from the peritoneal cavity, but no gas. The cæcum was delivered, and not more than twelve inches of the small bowel was examined before a single perforation as large as a silver dime was discovered. It occupied the free margin of the bowel. But thirty minutes was needed to open the abdomen, find and suture the perforation, irrigate the cavity, wipe the intestines of inflammatory deposit, provide for drainage, etc. This fact is mentioned more as an illustration that in some instances this operation may be very simple.

Case IV.—My fourth case was that of a young man who had been sick in the Virginia Hospital for several weeks. For the last week of his sickness his case had been complicated by retention of urine, induced by a specific urethritis contracted just before he was taken sick with fever. For a week it was necessary to catheterize him at regular intervals. At 10 A.M. he was doing well—pulse 108, temperature 104°, no pain, no abdominal distention, morale good. At 10.30 he had a movement from the bowels, and passed his water for the first time in a week. Immediately he complained of sharp abdominal pain, diffused over the whole abdomen. I saw him two hours later. An anxious expression, thoracic

breathing, and clammy skin were noticeable, his abdomen was flat but rigid, his pulse 130, and temperature 105°, and there was absolute cessation of peristalsis. This last symptom was carefully investigated by placing first the ear and then a phonendoscope over every part of the abdomen. Thoracic breathing, a rigid abdomen, abolished peristalsis, and increased pulse rate were the evidences which warranted an immediate cœliotomy. There was no appreciable shock, no abdominal distention, no lessened area of hepatic dulness, and no reduction of temperature. In four hours from the onset of symptoms I made a median section. On incising the peritoneum a quantity of bile-colored serum and fluid feces escaped, but no gas. On delivering the cæcum and last part of the ileum, two large perforations were found within twelve inches of the ileo-cæcal junction. The perforations were about four inches apart, both involved the free margin of the bowel, and both were ugly looking lesions. For some distance around the larger the tissues were thickened and indurated to such an extent that a resection was seriously considered.

Both lesions, however, were closed by deep superficial sutures. Prolonged irrigation, washing and wiping of intestines and cavity were practised. Even in this short time—four hours—membranous flakes were deposited around and near the bowel perforation. Multiple gauze drains were used. Although not more than fifty minutes were occupied in completing the operation, the patient reacted badly, and two quarts or more of hot saline solution were administered under the skin, and hot coffee and whiskey by the rectum, together with morphine, strychnine, digitalin, camphor, etc., hypodermatically. During this condition of shock he sweated profusely. Six hours after the operation the house surgeon reported that he had used the catheter, but found the bladder practically empty. In the nine hours the patient lived not more than a few tablespoonfuls of urine were secreted. As far as I can tell, this patient died from suppression of urine, possibly a post-operative sequence, and aggravated possibly

by acute gonorrhœal infection. A post-mortem found the peritoneal cavity practically dry, and no increased evidence of peritonitis.

The result of this case was a disappointment, as operative intervention was undertaken within four hours from the first onset of symptoms, and I counted myself as being particularly fortunate in getting into the abdomen early, and equally so in completing the operation in a reasonably short time. I was not at that time aware of the fact that better results have been obtained from operations performed about the twelfth hour after perforation, presumably after the reaction from shock of perforation and prior to the occurrence of shock of sepsis.

CASE V.—My fifth case[1] is interesting from the fact that the initial symptoms of pain, shock, distention, vomiting, muscular rigidity, and abolished peristalsis were marked, and perforation was at once recognized by his attending physician. This man had been sick with fever at his home for about three weeks. He was moved to a hospital, and the symptoms of perforation were manifested while he was being moved, or certainly very soon after reaching the hospital. I did not see him for twenty-four hours after the first onset of acute symptoms. At that time persistent hiccough, vomiting, shock, rigid and distended abdomen, reduced temperature, rapid pulse, and absent peristalsis were significant symptoms of gross intraperitoneal infection. On incising the peritoneum a considerable quantity of gas escaped. This was one of the few instances in my experience in which any quantity of gas was noticed in the peritoneal cavity, a sequence of hollow visceral wound. Two perforations, involving the free margin of the ileum, within two or three inches of each other, and within fifteen or twenty inches of the ileocæcal junction, were found. In this, as in all the cases operated upon, deep and superficial mattress silk sutures were used. In our desire to get the abdomen clean I think we

[1] Seen in consultation with Dr. Barksdale.

did too much. The cavity contained a quantity of seropurulent fluid, intestinal contents, and the evidences of fibrous suppurative peritonitis were generally distributed. The peritoneal cavity was washed out with a 50 per cent. solution of peroxide, and finally with a liberal quantity of saline solution. The intestines were carefully wiped, and multiple drainage provided. This patient practically died on the table, as he did not live more than an hour after the operation was completed. This patient was operated upon twenty-four hours after the first onset of symptoms of perforation.

The gross intraperitoneal lesions and the profound toxæmia is an illustration of what we may expect in delayed operative intervention, and is a confirmation of the opinion that after twenty-four hours an operation will rarely be successful.

It is claimed by Van Houck "that the only contraindication is a moribund condition of the patient." The difficulty is in deciding when the patient is moribund. An improved technique now removes from the moribund class in the past many cases of hollow visceral lesions and infections, and places them within the limit of the successful surgery of today. Very recently we witnessed a post-mortem after a death from typhoid perforation, which impressed the conviction that in some cases operation must be forlorn surgery, no matter how soon we operate. This post-mortem revealed general matting of bowels, fecal fluid matter, and inflammatory débris in the abdomen, two complete perforations, and a dozen or more with only a friable peritoneal investment intact. Simply wiping away the lymph to see if the perforations were complete was sufficient, in many instances, to make them complete. Nothing short of a resection of several feet of intestine could have saved the patient. It looks like desperate surgery to subject to a cœliotomy the cadaverous looking patient who has been ill with typhoid fever for weeks.

Granting that this is formidable surgery, the results have answered in the affirmative, that operative intervention is indicated in all cases.

Less than two hundred cases in all have been operated upon. Recall the thousands of cases annually occurring, and the need for co-operative study is apparent. Nothing short of a moribund condition should warrant us in abandoning the case as hopeless. The key to success is an early operation. In the infancy of our work we have saved more than one-fourth of the cases operated upon. We should save more than thirty-three and one-third by a timely operation. And even as to the seemingly moribund, as they are inevitably doomed without an operation, our convictions are well expressed by Greig Smith, when he wrote: "At the worst, happen what may, the patient can be in no more deplorable condition than before the operative interference was carried out, and I would plead for an attempt to reduce a mortality of 100 per cent." [1]

DISCUSSION.

Dr. F. W. Parham, of New Orleans, Louisiana, was called upon to open the discussion. He said: I have had no experience in this department of surgery. Thus far I have not had a case of perforation during typhoid fever brought before me for operation. I have not seen a case where I felt I was justified in operating, or where the symptoms of perforation were manifested in time to justify surgical intervention. I do not know why this is, that we should not have such cases. I state merely the fact. I have been very much edified by the paper of Dr. Taylor, and I think it is a subject that deserves our careful consideration. I am sure we are very grateful to the essayist for having presented the subject in such a complete manner.

Dr. George H. Noble, of Atlanta, Georgia.—It is true that but few of these cases are brought to our notice, due, I believe, to failure of the abdominal surgeon to impress upon the general practitioner the necessity of operative intervention in typhoid perforations. It is a question of education and a part of our work that has been very much neglected. It is a fertile field for work offering ample reward. Early recognition of the perforation by

[1] Abdominal Surgery, vol. ii. p. 783.

the practitioner and prompt action on the part of the surgeon will save a fair percentage of cases that are now doomed.

There is one feature not mentioned that I have found in two cases, the peritoneum and fascia united by first intention, but the skin and cellular tissue did not, as they separated on removal of sutures without showing any attempt to unite or granulate.

I would like to ask Dr. Taylor if he intended the statement he made in reference to operating for hemorrhage as a practical measure, or if he threw it out on theoretical grounds? If I understood him rightly, it must be with very little hope that we could go into the abdomen and search for a bleeding point if the hemorrhage is taking place within the intestinal canal. If he had reference to hemorrhage into the abdominal cavity, it is perhaps a different matter.

Dr. W. B. Rogers, of Memphis, Tennessee.—I do not think I can add anything of particular interest to what the essayist has said. Some four years ago I was called to see a case in which an operation was thought of, but the contraindications were so strongly marked that I declined to operate. The patient died in about six hours thereafter. The patient was in the fourth week of typhoid fever.

I recall another case of a young man whom I saw about three weeks ago, who had an irregular form of fever for fourteen or fifteen days. I saw him at night. His condition had been bad since morning, although he had not complained of great pain. His pulse was 160. I did not feel like giving him an anesthetic for the purpose of doing an operation, and declined to operate. He died about six hours later.

In a third case I was sent for to see a patient who had severe pain in the region of the appendix. He lived some distance from Memphis; he was brought to Memphis, and I operated on him that night. I found two perforations of the bowel, which I closed. There were six other small ulcers ready to perforate at any time. The peritoneal cavity was full of fecal matter and gas. The peritonitis was quite active. The patient progressed from bad to worse, and died twelve hours later.

It seems to me there is very little encouragement to operate in cases of typhoid perforation. Of course, there are selected cases in which we would get good results from operation; but the lowered vitality and the poisoned condition of the patient

offer very little encouragement for operative intervention in the majority of cases. While there are certain cases where an attempt ought to be made to save lives by operation, we will encounter others in which the contraindications are stronger than the indications for operation; in other words, the patients will not survive operation. My experience has been so unfavorable in the cases I have seen that I do not think an operation would be justifiable.

Dr. John T. Wilson, of Terrell, Texas.—I have not operated on a case of perforation from typhoid fever. In the majority of cases that have come under my observation of perforation from typhoid fever, it seemed to me that the depression was so great from shock, and the patient was in such an exceedingly weakened condition from the long attack of fever, extreme emaciation in many instances, etc., that they would hardly survive an operation. I must say, however, that within the last two years I have seen three cases in whom I advised operation, and I believe in those cases operation offered some hope, but was refused by the parents of the patients. One unfortunate feature in typhoid cases is the specific germ which complicates it, and in many instances the result would not be so good as if we did not have this germ to contend with. I have noticed in a great many cases of typhoid fever that died from hemorrhage and from the result of perforation, that in making a post-mortem there was found around Peyer's patches considerable purulent matter, and that, it seems to me, complicates these cases and makes them much more difficult to recover.

In regard to hemorrhage, it is a very difficult matter in my opinion to know just when to operate. I recall to mind a case that I had about twelve months ago in which the patient seemed to be in a moribund condition. I had a gentleman of considerable ability in consultation with me one night, and after leaving the patient he assured me that she would not live until the morning. I remained with the patient during the night, and she rallied somewhat, is living to-day and in good condition. I do not know how much blood she lost, but certainly a great deal. In a number of cases of hemorrhage, if we begin treatment in time, unless there is too much depression already, the patients will generally get well. That has been my experience.

I feel, Mr. President, that in Texas typhoid fever is very much

modified. We do not often see the severe and typical cases that you witness in Washington and in Virginia. It is true, we sometimes have a case that lasts six or eight weeks, but that is rare in the majority of instances. The larger proportion of cases go on for three weeks or twenty-eight days, with a temperature ranging from 101° to 102½°, rarely exceeding that, and even in the mild cases, as Dr. Taylor has stated in his paper, the patients seem to be on the road to recovery, yet perforation will take place when we think they are improving. Those are the cases in which an operation would promise more than those patients who are very much prostrated.

I am sure that this paper will result in great good. It will direct our attention to the subject more than it has been in the past, it will make us study the cases with greater care, and it will set us to thinking, and perhaps we may be able to save cases by a timely operation which would otherwise die.

Dr. Samuel E. Milliken, of Dallas, Texas.—I think what Dr. Wilson has said is true, that typhoid fever in Texas is not as malignant as it is in other parts of the country. I was called in consultation this summer to a house in the country where there were seven members of the family who had the disease. One of the cases was *in extremis* from perforation and was unfavorable for operation.

I believe, as Dr. Noble suggested, that the success of the operation for typhoid perforation will largely depend upon the future conduct of the general practitioner and his ability to persuade the patient or his or her friends to have an operation performed. I think we will have to go through the same schooling that we have experienced with operations for appendicitis, and I believe there is abundant opportunity for good work in the future.

Dr. W. D. Haggard, Jr., of Nashville, Tennessee.—I was unfortunate enough not to hear the paper of Dr. Taylor and a part of the discussion, but I have had one rather unique case which I wish to report briefly. The patient was in the third week of typhoid fever. She was a young woman, and had been married some eight months. When I saw her there was a large tumefaction in the right iliac region, tender and red, and it looked as though perforation was going to occur. The attending physician asked me to see the case, with a view to operating.

I believed that I had to contend with either an abscess due to appendicitis or a tubo-ovarian disease, and lastly I thought of typhoid. My belief was that it was an appendiceal case, because there was nothing in the pelvis to lead one to believe that the trouble was of tubal origin, and I thought the case was one of appendicitis from the start and had been diagnosed as typhoid fever. I operated, opened the sac, which was adherent to the abdominal wall, and quite a quantity of pus gushed out in a jet. I evacuated and irrigated the cavity and drained it, and I said to the doctor frankly that it was a case of mistaken diagnosis, it being a case of appendiceal abscess that had been walled off.

This was some years ago, when Widal's test was just brought before the profession, and I had the test made as confirmatory evidence of typhoid. The patient went on and had a typical attack of typhoid, after the septic symptoms had subsided, for three weeks longer, at the end of which time she died. The sinus had about closed, was perfectly clean and healthy, and to my great disappointment I was unable to obtain a post-mortem examination of this case. I have not reported it heretofore because I was not positive that it was a case of typhoid fever with perforation, but one would naturally conclude that it was. I speak of this because, according to the literature of the subject, cases of typhoid fever with perforation resulting in abscess are rare. They nearly all die from the immediate effects of the perforation and nature has not time to wall it off and convert the infection into an abscess cavity. I think it is stated that about 9 per cent. of the fatal cases of typhoid fever die of perforation.

Dr. George S. Brown, of Birmingham, Alabama.—I have not had any experience in operating in cases of typhoid fever with perforation, but there is one point to which I desire to call attention, and that is the attitude of the profession toward operative interference. One reason why general practitioners have not taken more interest in this matter is because of the prevalent notion that these cases are in a desperate condition after perforation has taken place. I heard Dr. Cushing, of the Johns Hopkins University, read a paper in which he reported four cases of typhoid fever with perforation, and he said that these were by no means in an unfavorable state for operative interference, and that a great many of them were in a good condition for operation. Furthermore, surgeons generally have not taken an active

interest in operating on these cases with perforation, and if the surgeon does not do so, we cannot expect the general practitioner to do it.

I would like to ask Dr. Taylor to tell us where these perforations occur as a rule, and which would be the best incision to reach them, whether in the median line, or along the rectus muscle over the cæcum.

Dr. Joseph Taber Johnson, of Washington, D. C.—I would like to ask the essayist what he would do in cases where there is a large number of perforations of the intestine. In some instances there have been reported as many as twenty-five small perforations, and I would like to ask him how he would manage these cases, whether he would sew them all up, or resect a portion of the bowel in which a number of the perforations were close together.

Dr. Taylor (closing the discussion).—With reference, first, to the question of Dr. Johnson as to what I would do if there were multiple perforations, this point has been decided by those who have written upon the subject. If the perforations are close together, resection offers a better chance than multiple suturing. If the perforations are not near one another, then multiple suturing offers a better chance. All cases ought to be operated on, not only those *in extremis*, but those that are convalescent and in a better condition. I can hardly conceive of a case in which a surgeon would be justified in not operating if the patient is convalescing and in good condition for the operation. I think all cases ought to be operated upon, because, as Greig Smith aptly says, who can tell with absolute certainty that the patient is in a moribund condition, inevitably doomed to die when there is a bare possibility that life may be saved by operation?

As to whether we are justified in operating on cases in which there is hemorrhage, I do not believe in sitting inertly by the bedside of a patient bleeding to death from a typhoid ulceration. I grant you that it is beyond the power of man to say that that patient is hopelessly doomed because of that hemorrhage. I have seen patients bleed to the point of syncope, and stop and get well. Again, I have seen cases that have bled to death within the first week or ten days' confinement in bed from typhoid ulceration. If I were able to tell that a patient was inevitably doomed I would open his abdomen and make an effort to find the bleeding-

point, and, if necessary, ligate the bleeding vessel in the mesentery, or resect the bowel. In my paper I quoted Dr. Keen as showing that he believed it difficult to locate the bleeding-point within the bowel. I do not know whether it would be impossible or not to locate the bleeding surface. In some cases there is only a transparent peritoneal investment between the bleeding surface and the eye, the mucosa and muscularis are gone, and there is only transparent peritoneum to see through. I do not know that it has been done, nor do I know that it is a feasible surgical procedure. But if it is true, as is claimed, that one-fifth of the deaths from typhoid fever are due to hemorrhage, it leaves a large number of cases that ought to be brought within the province of surgery in some way. Medicine has failed, and it is to be hoped, if such an operation is justifiable, that in the future we will devise some means of lessening the mortality incident to hemorrhage by surgical intervention.

I cannot agree with the gentlemen who think that operating upon these cases is such disastrous or forlorn surgery. Fully 27 per cent. of all sorts of cases (not selected) have been saved by skilful surgeons, as compared with 100 per cent. mortality without operative intervention.

Dr. Rogers.—I would like to know where the doctor obtained his statistics.

Dr. Taylor.—Those are the statistics (as to the number of recoveries) of Dr. Keen, who is a painstaking investigator, and who is as good an authority as we can possibly get. Of course, statistics all over the country are quite inaccessible.

In reply to the question as to the best point to make the incision, I do not think it makes much difference. The perforations can be reached either through a free median or a lateral incision.

SOME INTERESTING CASES OF ABDOMINAL SURGERY.

(*a*) PANCREATIC CYST. (*b*) HEPATIC CALCULI. (*c*) FECAL FISTULÆ. (*d*) COMBINED APPENDECTOMY AND NEPHRORRHAPHY.

By Floyd Willcox McRae, M.D.,
Atlanta, Ga.

Case I.—W. R. B., white, male, aged sixty years; farmer; married. Admitted July 17, 1899.

Family History. Says father died, he believes, of some growth in the abdomen. Mother, brothers, and sisters healthy.

Past History. Sixteen years before, while in Florida, he had chills and fever for a year.

About thirty years before he was taken with a sudden excruciating pain in the left lumbar and iliac regions, which persisted three or four hours—*i. e.*, till after the application of a mustard plaster. Passed bloody urine at that time.

Has had similar attacks four to five times a year for the next twenty years. Diagnosed renal calculi.

When having an attack has constant desire to urinate, but would void only a very small amount. Left side always remained tender.

Fifteen or twenty years ago, stepping on the hub of a wagon wheel, he struck his left side on the rim of the wheel, causing severe pain for about an hour.

For the last twenty years, on considerable exertion and getting warm, as ploughing, he becomes completely exhausted, weak, and nervous.

For the past few years he has had a burning sensation in the upper part of the abdomen. Could not eat as much as formerly because of a sensation of fulness ; no vomiting, but occasional pyrosis. No abnormal appetite nor dislike for food. Has always had tendency to constipation, and for the past year or two this has been worse, bowels seldom moving without a cathartic. No diarrhœa since 1860.

When in the hospital, two years ago, he became aware that something was wrong in the abdomen by a sensation of moving and contraction of the bowels.

Two months before admission he noticed a mass about the size of his hand just below the border of the right ribs and about the median line above the umbilicus. Had no pain, but an uneasy feeling in the abdomen. Had lost from seven to eight pounds of flesh in the past four or five weeks.

After some medication, six weeks before, he had a good appetite, but food seemed to do him little good. Large, hard mass in the left middle abdominal region firmly fixed ; slight cystic feel ; diagnosis in doubt ; malignant disease suspected ; unfavorable prognosis given.

An exploratory incision was decided upon and done the day after admission, July 18th, 9 A.M.

Large cyst of pancreas revealed on going into abdomen. Trocar introduced, and about three pints of oily, straw-colored fluid were obtained. Cyst firmly adherent to concavity of spleen. Spleen slightly enlarged and displaced downward, forming left boundary of the tumor, thus greatly enhancing the difficulty of diagnosis.

Upper and lower ends of incision closed with through-and-through silkworm-gut sutures, and peritoneum sutured to skin for middle two and one-half inches of incision with fine silk. Cyst then opened, and edges of opening sutured to abdominal wound with fine silk.

Large drainage-tube (rubber) introduced, containing gauze wick, and held in place with silkworm-gut suture.

Absorbent dressing then applied and patient put to bed.

Strychnine, grain one-thirtieth, every three hours.

No trouble was had with nourishment, which was gradually increased, getting chicken broth, albumin, panopeptone, and buttermilk, one or the other, every three hours.

On the second day his temperature reached 101° F., and on the three succeeding days it ranged from normal to 99.6° and 100° once or twice daily; thereafter it was normal.

He was given a light diet on the 23d—the sixth day. The dressings were changed as necessitated by the amount of discharge, at first bi-daily, later daily, and so on.

His recovery was rapid and uneventful, and he was discharged "improved" on August 14th.

CASE II.—Mrs. C., aged thirty-four years; married.

Family History. Negative. Healthy except dyspeptic for several years. Subject to attacks of colic, or what she supposed to be acute indigestion. About six weeks prior to operation had a severe attack of colic, followed by "bilious fever" (?) for two weeks.

I saw the patient first in consultation with Dr. G. G. Roy, August 8th. On examination found a tumor about the size of a fist, occupying the region of the gall-bladder, extending about two inches below the ribs. Slight jaundice. Lungs, heart, and kidneys normal. Diagnosis: gallstone-cholecystitis. Early operation advised.

Operation, August 9th; ether.

On opening the abdomen, coming down on the tumor, I found what seemed to be an enlarged gall-bladder, but which on examination proved to be an enlargement of the liver itself. The growth was very hard and nodular, presenting many of the characteristics of malignancy.

Dr. Nicolson, who helped me, and I were both in doubt as to just what its character was. Introduction of an aspirating needle showed that it contained a dark serous fluid, but nothing definite was determined as to its character.

I immediately stitched the parietal peritoneum to the surface of the liver, leaving a space about as large as a half-dollar uncovered. I then packed the wound with iodoform gauze, closing the two extremities with silkworm-gut sutures.

The packing was left in three days, when it was removed, leaving the surface of the liver uncovered.

I immediately made an opening down to a hard body in the substance of the liver, and with a curette removed thirty gallstones of almost uniform size and shape. A drainage-tube was inserted, and gauze packed around it.

On August 14th three more stones were removed; 16th, ten; 20th, one; 24th, three; 26th, two; 30th, two; and eight have come away since. There is still a discharging sinus, but practically no pain.

The patient has gained flesh rapidly, and weighs fifteen to twenty pounds more than she ever did before, and enjoys the very best of health.

CASE III.—D. S. P., white, male, aged thirty-seven years; stair builder. Admitted August 9, 1898.

Was operated upon for appendicitis in March preceding; a suppurating sinus remained, and afterward developed into a fecal fistula, which discharged freely, especially when bowels were loose.

This gave him pain at times. Had indigestion all summer, but had been able to work some. Bowels had been moving about twice daily.

Operation, August 12th, 1.30 P.M.

Sinus was packed lightly with iodoform gauze. Elliptical incision was made outside this tract through abdominal wall; surrounding tissues carefully dissected and separated from sinus, which was found to enter cæcum at base of appendix. Appendix was found very large and indurated, and surrounded by a mass of inflammatory deposit. This was dissected out down to base near cæcum. Removed, cauterized with carbolic acid and buried in-fold of gut with sutures of No. 7 silk, four or five tiers of sutures being put in.

Operation tedious, occupying two hours and fifteen minutes of uninterrupted work.

Iodoform gauze wick, surrounded by fenestrated rubber-tissue drain, left in; wound closed with silkworm-gut.

The drainage was removed and left out next day, the wound being clean.

His temperature went up to 102° F. on the 14th, but came promptly down on administration of quinine bisulphate, grains five every four hours to seven doses, and remained normal thereafter.

His recovery was uneventful after removal of the sutures, on the 19th, and he was discharged, cured, on October 11, 1898.

Case IV.—J. B. S., white, male, aged thirty-seven years; dairyman. Admitted May 16, 1899.

Health good until four years prior to admission, when on catching a falling milk vessel had severe pain in the right inguinal region. This grew worse, and he had to go to bed. Right leg seemed affected, always feeling better when flexed on thigh. In bed three months at this time, and noticed "lump" in right side.

About January 23, 1899, iliac region of the right side began to pain him slightly; had no general abdominal tenderness or vomiting, but bowels could not be moved for a week. When gas accumulated in the bowels the mass inside seemed to get larger. Right leg still more comfortable when flexed.

Admitted with mass in right iliac region to inner side of crest, extending downward; slight tenderness; temperature 102.8°, pulse 88; tongue rough and coated; no appetite and some diarrhœa.

Operation, May 18th, 2 p.m. Dr. Nicolson.

Point of tumor in right iliac region, which would be tympanitic at times, dull at others; was tympanitic while on table before operation.

Incision over McBurney point; extensive cavity three inches long by two inches deep, which contained an ounce of creamy pus and a concretion about the size and shape of a partridge egg. Inner wall of cavity formed by outer surface of cæcum, in which was a fimbriated opening admitting the index finger. Appendix not found. Cavity sponged

clean and wound closed with silkworm-gut sutures, iodoform gauze drain being left at its middle.

Fecal fistula dressed daily, and oftener when necessary—sometimes four or five times daily—irrigations at times, and then none—packing at times, and then no packing, from the first operation until September 11th, when second operation was done.

Opening in gut could be easily felt and plainly seen with light at proper angles, but closed very little under all the forms of treatment tried.

A moist gauze (saline) dressing daily seemed to exert the best influence over the discharge, amount, odor, absorption, and so on. A cavity, holding from two ounces at first down to one-half ounce just before the operation persisted, the contents of the bowel dropping into it from opening in gut, and when cavity was filled dressings becoming saturated.

When this cavity was well packed it seemed that discharge was lessened, probably by pressure on opening in bowel.

September 11th, second operation; chloroform. Dr. McRae, assisted by Dr. Nicolson.

Opening of old fecal fistula enlarged. Mucous membrane of gut very unhealthy for an area the size of a silver dollar about the opening in the cæcum. Adhesions of cæcum to wall broken up, and remainder of appendix (about one and one-half inch) also separated from a bed of adhesions.

Small portion of the cæcum at the site of the opening and appendix resected, and gut brought together with a Czerny suture, and four or five layers of Lembert sutures of No. 7 black silk put in, one layer above the other.

Cicatricial edges of wound then trimmed off and sutured with silkworm-gut.

Gauze drainage was put in and moist saline dressing applied. This was changed on the third day, 13th; wound clean and no odor. Same re-applied.

A thin, yellowish fluid oozed from the drainage wound for twelve days, necessitating a daily change of dressings. Cavity held from a drachm to a drachm and a half of fluid when filled.

This closed slowly but steadily, and he was discharged, cured, on October 7th, twenty-six days after operation.

CASE V.—Miss L., aged twenty-nine years. Admitted October 12, 1899.

Family History. Father died of heart disease, mother of consumption, one brother of rheumatism.

Past History. Always delicate; subject to colds. Very painful menstruation. Tubo-ovarian disease for three years. In bed five months prior to removal of ovaries and tubes, July, 1895. Floating kidney was found, but nothing done for its relief except direction as to abdominal support.

No relief from removal of tubes and ovaries.

On July 6, 1896, I did a right nephrorrhaphy; complete relief for fourteen months, when she had a fall down a flight of stairs, and partially broke loose the anchorage.

The fall was followed by subacute appendicitis; in bed for seven weeks. Rested up, and after a few months felt as well as before the injury, and resumed nursing one year after the fall without inconvenience until March, 1898, when she had an attack of appendicitis with high fever, and confined to bed for two weeks.

Never felt well afterward, but was about until September, 1898. Had a mild relapsing appendicitis, more or less pain all the while.

On admission heart and lungs were negative, but urine showed microscopically a few hyaline and granular casts. This cleared up under treatment, until at the time of operation, October 17th, only two casts were found.

Operation, ether.

Usual incision for the removal of appendix. Appendectomy completed in the usual way, except closure of abdominal incision. Next separated the parietal peritoneum down to the right kidney, which was very readily accomplished. With a full curved Hagedorn needle three sutures were put in after incising the perirenal fat. The sutures took a good bite of the kidney, and then were carried deeply into the muscles and brought out again. They were tied without

much difficulty, and held the kidney well in place. Kangaroo-tendon sutures were used. Considerable difficulty was experienced in putting in the sutures, but this was finally accomplished in a very satisfactory manner. The abdominal wound was closed in layers, and the patient put to bed in excellent condition. In some way the superficial structures were infected—evidently streptococcus infection—and the subsequent fever and prolonged convalescence were due to this cause.

She suffered much pain after operation, morphine being necessary twelve hours after the operation. Temperature was 101.6° six hours after the operation, and the quantity of urine was found very small. An enema of normal salt was given on taking her off the table, and the following day alum enemata, followed in two to five hours by saline enemata, were started and kept up daily.

Strychnine, grain one-thirtieth, every three hours, was given, and morphine was occasionally necessary.

On October 20th, diuretin in seven and one-half-grain doses, t. i. d., was begun, and a grain of calomel given at bed-time.

Lithia water *ad libitum* was started the next day, and she was persuaded to drink as much as possible. The quantity of urine steadily increased from day to day, from ten to sixteen ounces after operation to thirty-five to sixty ounces on October 28th to 30th. No morphine after the 23d.

The temperature ran high after the operation, going steadily up from day to day until on the 22d it reached 103.4°. Chloroform was administered, and an incision was made over a hard mass in the right side over the kidney area, and about three drachms of pus and some bloody serum evacuated. This was dressed daily, and the temperature declined some, but never reached normal until after an exacerbation on November 8th, when it went back to 103.6°. The high fever here remained only two days, and the normal range was reached and held to from November 11th.

Case I. presents several features of special interest.

The history of repeated attacks of renal colic and the loca-

tion of the tumor pointed to hydronephrosis, and the general appearance, rapid emaciation, obstipation, age, and general characteristics of the growth to malignancy. I should have made a positive diagnosis of malignant disease, but for the fact that the tumor seemed cystic toward the median line. Dr. Cooper, who saw the patient, made a rather tentative diagnosis of cancer of the stomach. Dr. J. H. McDuffie, the family physician, suspected hydronephrosis.

Exploration of the cyst revealed no cause for its development and the utter impracticability of its complete removal. I have kept up with the case, and while there is still a considerable discharge of pancreatic fluid the quantity is constantly diminishing.

The general condition of the patient is good.

Case III. puzzled me exceedingly. I have brought quite a number of the stones removed with me. They are about the size of large buckshot, highly polished, almost black, and irregularly quadrilateral. They were probably formed in the gall-bladder, ulcerating through its roof into the liver. The adhesions were such as to make a careful examination of the under surface of the liver impossible.

Cases III. and IV. illustrate one of the untoward consequences of incomplete operations for appendicitis.

No operation for appendicitis that consists in simply opening and draining an abscess without complete removal of the appendix can be considered with any degree of certainty curative. A large proportion of such cases will require subsequent operations to effect cures.

I think the method of closure adopted in the two fecal fistulæ is worthy of further trial. In both there were extensive adhesions, great induration, and thickening of the cæcum. I do not believe any other method except a complete resection of the cæcum would have proved curative.

I shall in future employ this method with a great deal of confidence in this very troublesome class of cases.

Case V. I believe represents an entirely new procedure—*i. e.*, that of appendectomy and nephrorrhaphy through the

same incision. I did not do the operation as I had originally intended to do it. It was my purpose to remove the appendix, separate the peritoneum, incise the perirenal fat, put my sutures in the kidney with a long straight needle on each end of each suture, then have my assistant make a lumbar incision through the skin and superficial fascia. I next proposed forcing the needles through the lumbar muscles, and tying the sutures, closing the skin and fascia over these sutures, thus burying them. After getting down to the kidney, however, I felt sure that I could accomplish the same result without making another incision, and finally succeeded in doing so.

The infection of the wound that followed was a most unfortunate circumstance. I feel sure it was due to an unguarded act of one of my good friends who is a surgical enthusiast. He came in just as I had finished putting in the renal sutures, and after explaining to him what I was doing he thoughtlessly put his (surgically) dirty hands on the operating field. Whether the infection was due to this or some other cause, I do not know. I do know, however, that it was not only superficial, but very virulent, and showed a tendency to burrow. The operation of appendectomy and nephrorrhaphy is a perfectly practicable operation.

I am indebted to Dr. W. Hal Moncrief, House Surgeon at Grady Hospital, for the histories of Cases I., III., IV. and V.

DISCUSSION.

Dr. A. M. Cartledge, of Louisville, Kentucky.—Mr. President: I was very much interested in the report of the two cases of fecal fistula. In my experience these cases are unusual following operation for appendicitis, and I have been fortunate to have them all close without a subsequent operation. I was interested in the perforation being near the cæcum. Experience leads me to believe that when an abscess forms about the appendix it ruptures in almost all of the cases in or about the base of the appendix through the cæcum. I have not only found this at operations, but so many times have I found the appendix en-

closed, hidden from view, with a greatly thickened cæcum, with pus oozing from it ready to break inside. The great majority of abscesses break about the base of the appendix through the cæcum. I am sure of this. I am satisfied that an abscess rarely breaks into the small intestine, and I am further satisfied that it rarely breaks into the peritoneal cavity—that is, if the patient lives long enough for the abscess to form about the appendix it does not break into the peritoneal cavity once in a hundred cases. In an experience embracing five or six hundred cases, operative and otherwise, I have never seen an abscess about the appendix break into the free peritoneal cavity after the sixth day but three times.

Of all the trying things to operate upon, fecal fistulæ are the worst, and I think that those who have had experience in dealing with them will agree with me that fistulæ about the cæcum are the easiest, as a rule, yet these prove very difficult sometimes where the opening is large, and I remember having a case of this kind upon which I operated three times before I succeeded in relieving it. Fistulæ about the cæcum are the most accessible.

In dealing with fistulous openings I was impressed with the pleating the doctor refers to. I have been doing this, but not as extensively as he has. I believe he overdoes it, but it is an excellent principle.

In fecal fistula of long standing the same conditions obtain that we find in the acute inflammations—that is, the cæcum is thickened; it is soft, and stitches cut out. Take a cæcum one-quarter of an inch thick with a fistula entering it, if you repair it and put in Lembert sutures, half of the sutures will cut out. I think the ideal principle involved in the treatment of these cases is to put in a double or three rows of sutures. I scarcely think it is necessary to make five pleats.

Gauze drainage interferes with the success of operations for the closure of fecal fistulæ; it interferes with repair. Dr. McRae has given us a valuable suggestion in the double-row pleating. We can do this in the cæcum; it is large and baggy; we can build up the peritoneal wall, which is a protection against any perforation. It is an excellent idea and insures the success of operations in these cases.

Dr. Ernest S. Lewis, of New Orleans, Louisiana.—With reference to the effects of gauze as an irritant and as producing

ulceration, last summer I was called to see a young lad about thirteen or fourteen years of age who had had appendicitis. Rupture had taken place about ten or twelve hours previous to my visit. He was almost in *articulo mortis.* I saw him at four o'clock at a place about a mile from the infirmary where I usually send my cases. I presented the gravity of the case to the family and urged the importance of immediate surgical intervention. An ambulance was telephoned for, and at five o'clock he was on the table undergoing operation. I opened the abdomen, and about a quart of offensive pus and fecal matter escaped from the wound. After thoroughly washing out the abdomen, putting in a tube in different directions, separating the agglutinated intestines, I packed the abdominal cavity in different directions, but did not attempt to close the opening in the cæcum, but left the wound wide open. I think I used four or five gallons of warm water in thoroughly washing out the abdomen, and I packed iodoform gauze in several directions so as to thoroughly drain the abdominal cavity. Next morning, to my surprise, the temperature had fallen to 99.5°. The abdomen, which had been tympanitic, was flattened. The boy had stopped vomiting and his condition had improved. The wound was gradually closing; about the end of the second week there was a larger escape of fecal matter, and I noticed that that portion of the small intestine with which the gauze was in contact had become softened, highly congested, and I concluded that as the boy's general condition had improved I would cut down lower and endeavor to stop the fecal weeping, fearing that if I allowed this condition to continue that he would succumb. I enlarged the incision, and with some difficulty managed to reach the opening in the cæcum, which was as large as my little finger, but which I thought was sufficiently walled off before as not to require an immediate operation at the time I performed it. I stitched it up, and in pressing with my finger upon the intestine that was exposed and pinching the gauze, my finger went through the soft small intestine, and I found two or three perforations in the small intestine where the gauze had been in contact, not tightly packed, between the coils of the intestines, for drainage. For this reason I believe that the continued use of gauze is a dangerous procedure and is liable to result in ulceration of other portions of the bowel that are not previously affected. This patient succumbed at the expiration of

three weeks, and at the time the operation was performed I had only given him three hours to live, as the pulse was almost imperceptible.

Dr. J. Wesley Bovée, of Washington, D. C.—I have listened to the report of these cases with a good deal of interest, and while I do not feel that I could add anything to what has been said, perhaps I can learn something by asking the essayist a question or two. I would like a little more light on the subject of how he fastens the kidney up through the small incision made for the removal of the appendix. My procedure in fastening the kidney is to make my incision as high as I can make it, the upper end extending to the ribs, and it would seem difficult, if not impossible, to fasten a kidney by its suture through an incision in the groin for appendicitis. I wish Dr. McRae would tell us something more definite about that.

Dr. Samuel E. Milliken, of Dallas, Texas.—Dr. McRae said he believes that spontaneous closure of a fistula following appendiceal abscess was rare and not to be expected. I think this depends very much upon the direction of the abscess. I believe if the abscess opens posteriorly the fistula is very much more likely to close spontaneously than when it opens anteriorly, especially in the lower inguinal region. I recall two cases illustrative of this point. In one case a third recurrent appendiceal abscess opened and drained without fecal fistula. The external wound closed twice, and in the first instance remained so four and a half months. Under ether the sinus was dissected out three weeks following the third abscess evacuation, and while we found the cæcum closed there was present a little cheesy mass at the site of the appendix. In another case occurring about the same time, in October, 1898, a very large appendiceal abscess was opened posteriorly under cocaine anæsthesia, the patient being in an extreme condition. A large rubber drainage-tube was inserted, and quantities of fecal matter and débris came away for several weeks. From my previous experience I felt it was not right to allow the fistula to close spontaneously without making an investigation as to the condition of the gut. I therefore made an anterior laparotomy and found the cæcum had closed and there was no further reason for operative interference.

Dr. McRae (closing the discussion).—My reason for putting in several rows of sutures was that the operations for fecal fistula

which I have seen done by other surgeons were very unsatisfactory, and the experience was very similar to that which Dr. Cartledge had, requiring repeated operations, and frequently failure, then. The tissues here were of such a character that there was no normal peritoneum; it was all scar tissue I was dealing with. It does not take such a great folding-in of tissue, as one would at first think, in putting in these sutures. They are first put in folding in a small amount of tissue interlacing each row of sutures; in that way you put in five tiers of sutures without folding in a large piece of bowel.

As to drainage, I agree with Dr. Cartledge that the gauze drain should not be packed down to the surface where the fistula in the gut was. In a case like the one I have reported, with a large amount of scar tissue and oozing surfaces, with a cavity that has been full of pus and fecal matter, where it is impossible to remove all of the diseased tissue, I feel safer to leave a superficial drain so that the secretion which naturally takes place has a means of exit. The tissues are not as elastic as they should be, and we are apt to leave a dead space. Superficial drainage, therefore, is a very essential feature in the treatment of such cases.

The question of Dr. Bovée is very pertinent. The difficulty of putting in these sutures is, I confess, quite considerable—that is, putting in the sutures in a nephrorrhaphy through an appendectomy incision. In this instance I made the incision higher up than usual, so that the lower end of it came down to the McBurney point. The incision was three and a half inches long, and with a long needle-holder and a full curved needle, by putting sutures first in the kidney, displacing it downward and inward a little, I could put them through the lumbar muscles high up, and then, after all the sutures were in place, they were tied without much difficulty. I should not hesitate to do this operation again in similar cases. We know that floating kidney is one of the causes of appendicitis, a condition which is not infrequently associated with this disease. I believe it is better to do the operation which I have mentioned here (and which I think is original) than to do two operations. I could do this operation again with much greater facility. The infection which followed the operation was not in any way due to the method. The kidney is now in place; the patient is in good condition, and she

survived all of this operative intervention in spite of the infection that occurred.

As to the remarks of Dr. Milliken, I think he misconstrued my paper. I did not mention the ordinary fecal fistula following operations for appendicitis not closing, because it has been my experience that they do, as a rule, close. If we simply leave them alone, treat them on ordinary surgical principles, carrying out surgical cleanliness, they close, and no untoward results follow spontaneous closure. In a certain number of cases they do not close, and then it is necessary to resort to some surgical procedure in order to close them. My first impression in these cases was that complete resection would be the best thing to do; I finally decided on doing the operation which I have described, and I feel sure that the results which I obtained justified the procedure adopted.

LITHOLAPAXY.

By Geo. S. Brown, M.D.,
Birmingham, Ala.

A very limited experience with the operation of litholapaxy has led me to believe that it is being unwisely, although not altogether unreasonably, neglected. The most important cause for this neglect is, perhaps, that the cutting operations, particularly the suprapubic, are very easy to do, and the results are very satisfactory. This sounds somewhat paradoxical, however, when we recall the statistics. Those, for example, in Prince A. Morrow's book, which show an average mortality for the suprapubic of 18.86 per cent., are divided as follows:

Children under fourteen years, 591 cases, with 74 deaths, 12.52; adults, fourteen to fifty years, 100 cases, with 12 deaths, 12; old men, 53 cases, with 17 deaths, 32.07; average, 18.86 per cent.

Undoubtedly this seeming high mortality must be considerably lowered by the facts. First, that these collected statistics are taken from hospital records; that in hospitals where litholapaxy is done at all the suprapubic cases tend to be the selected bad ones. Second, that very many unrecorded cases are done by the occasional operators scattered over the country, whose patients are for the most part children and young adults, and whose results must be correspondingly good.

These discrepancies corrected would undoubtedly show the suprapubic operations in a more favorable light than the perineal section. Still, the difference between these statistics and those given for litholapaxy is too wide to be thus bridged over.

Statistics taken from the same work for the two other methods are as follows:

For perineal lithotomy: Children under fourteen years, 539 cases, 16 deaths, 2.96; adults, fourteen to fifty years, 177 cases, 19 deaths, 11.3; old men, 48 cases, 8 deaths, 16.66; average, 10.31 per cent.

Litholapaxy: Children under fourteen years, 241 cases with four deaths, 1.66; adults, fourteen to fifty years, 400 cases with 13 deaths, 3.25; old men, 433 cases with 26 deaths, 6; average, 3.64 per cent.

Gross' general table, published in 1882, of 13,570 operations by cutting methods, including all ages and without selection of cases in any way, and by many hundred operators in this country and Europe, shows a mortality of 12 per cent.

Keegan[1] reports: litholapaxy, 10,073 cases, mortality, 3.96 per cent.; lateral lithotomy, 7201 cases, mortality 11.02 per cent.; suprapubic, 147 cases, mortality, 42.17 per cent.

This, as he says, shows that there are many skilled litholapaxists in India, and also that there is a strong bias there against the suprapubic method. So that the strong inference is that the suprapubic was resorted to in most of these 147 cases because the stones could not be removed in any other way—that is, they were selected bad cases.

Another of the reasons assigned for not using the crushing operation aside from the tempting ease with which the suprapubic is done is that the number of stone cases occurring in the practice of the average surgeon is so limited he does not have the opportunity to develop sufficient skill to make it worth his while. This seems to be one place where a limited experience may be worth something, so I shall here give the result of mine, as showing that the occasional operator who is careful to follow instructions may find it worth his while to crush in such cases at least as are most favorable to the operation.

My first case was briefly as follows:

Mr. F. H., aged fifty years, had been a sufferer since boyhood from cystitis, due to injury. In 1887 he was cut through the

[1] Lancet, January 30, 1897.

perineum for stone by Mastin, of Mobile. In January, 1897, he again had symptoms of stone; he discovered it himself while passing a sound for strictures. In May, 1897, he insisted that I should get a lithotrite and try to crush it, as he did not have the time or patience to spare for being cut again. He was suffering a good deal, and getting up to urinate every half-hour at night, which was beginning to tell upon his general health. I met with no difficulty in the operation except that his urethra was the seat of numerous strictures which had first to be cut and dilated. The stone, a soft phosphatic one, weighed about 70 grains. The first night after the operation was the most comfortable one he had had for three months, and the next day he was up and about the hospital, the third day he went home, and the fourth day to his office.

His bladder was washed out daily for three weeks, or until the mucus had entirely disappeared. For the first few washings a few fragments of the stone were brought away, together with a great deal of muco-pus. It is now two and a half years since the operation, and he has had no return, and the cystitis seems about well.

My second case was an old man, aged seventy-three years. In May, 1897, he bruised his perineum, rupturing the urethra and causing a large abscess, which was opened by some homœopathic surgeons. After the pus was evacuated they put a soft catheter into the bladder through the urethra, reasoning that the fistula could not close if not kept free from urine.

This catheter was left in four weeks before an attempt was made to remove it. The attempt was not successful, and six weeks after the introduction of the catheter, July 8, 1897, the patient was brought to me. The catheter was incrusted inside and out with the earthy deposit and was immovably fixed in the urethra. Under ether I passed a No. 8 French sound forcibly through the lumen of the catheter, supposing that a stone had formed at the eye. This proved to be correct, as I felt the stone break off under a slight pressure.

The incrusted catheter was removed forcibly and the bladder washed out, but the old man's condition was so bad it was

thought best to wait until later to crush the stone if there was one there, which was conjectural, as a good many fragments came away in the washing, and no stone was found after a limited search. The bladder was washed out daily for two weeks, when the fistula closed and the urine was clear, and he was discharged. A few weeks later, about October, 1897, he again had irritation and inflammation of the bladder; he again resorted to homœopathic treatment, which he continued until May, 1898, when he came back to me. He had a soft phosphatic stone one inch in diameter; this was crushed and washed out in about one hour and a half. He had slight fever for two days, but was up on the fourth day. At the end of ten days the muco-pus had all disappeared from the urine and he could retain his urine from four to six hours. It is now a year and a half since the last operation, and he has had no further trouble.

My last two operations were on one patient, H. B., aged fifty years, coal miner; had had four suprapubic cystotomies in the previous ten years for recurrent stone. He said he was never free from symptoms of stone for very long after any operation, and after the last one, November, 1898, the period of relief was shorter than usual, and he had been passing his urine almost every hour the whole time until he came to me, May 27, 1899. The stone as measured by the grasp of the lithotrite was about one inch in diameter and was quite soft, so soft that it clogged the instrument frequently and required over two hours for the operation. He passed his urine only three times the first night, and said the next morning that he felt a great deal better than he had felt any morning for six months. He did not see why he could not go home; he went out and did not report until August, three months later, when he came back with another stone about half as big as the first one.

He was instructed at the time of his discharge in May to wash his bladder out daily until all the muco-pus had disappeared. He confessed that he had not done this a single time. This second stone was crushed between eleven and one o'clock. The patient slept until five, and then went home on the train,

saying he was going to work the next morning, and he has not since reported, though I have heard through his physician in the last few weeks that he has had no further trouble.

[NOTE.—On December 9, 1899, I again operated upon this third patient, H. B. (The third crushing operation.) The stone was a soft phosphatic one. The whole operation of washing the bladder, catching and crushing the stone and washing out the débris occupied thirty minutes. It was done, too, without causing a tinge of blood to the water contained in the bladder. The first night he passed his urine twice, instead of twelve or fifteen times, as he had been doing before. He went out next morning and has been reporting since as an office patient to have his bladder washed out.]

I report these cases more to show that the operation is not as a rule a difficult one for the beginner, than for any special clinic value they possess.

The operation is applicable to all stones of moderate size which are not encysted in a diverticulum of the prostate or the bladder wall, and which are not too hard or too large to crush. Under these restrictions probably the majority of stones in this country can be managed with the lithotrite. It is true that Brigade Surgeon Lieut.-Col. D. F. Keegan, of the British army in India, in an article in the *Lancet* of January 30, 1897, is not encouraging to the occasional operators, as all surgeons of Europe and America are to be regarded in relation to the stone operation.

He shows that the mortality in his own work and that of his brother experts, Forbes-Keith, Freyer and Baker and others, shows a steady and marvellous fall as they gain in experience, notwithstanding the fact that as they progress in skill they operate on more and more difficult cases. Their mortality has averaged from about 14 per cent. in the beginning down to 1 and 2 per cent. in their later work.

Richard Baker, indeed, for two years had had up to September, 1897, 404 operations, with only two deaths, less than half of 1 per cent. Keegan also warns the beginner not to be over-confident because his first few cases have been successful;

that the trouble will come sooner or later to the inexperienced. My cases have all been soft phosphatic stones, which, though less difficult to crush, are more difficult to catch, on account of their lightness, and require a longer time to crush and wash, on account of the clogging of the blades and the tenacity with which the mucus-covered walls of the bladder hold these lighter particles. Baker gives the average time of 204 operations as twelve minutes and nineteen seconds. We can believe this only on the assumption that the greater number of the stones were small, heavy, primary, acid stones, but which were not too hard to be easily crushed.

I shall not weary you with a review of the history, cause of, and distribution of stone, nor of the history of the various operations for its relief.

I shall only say a word about the accepted theory of formation of the stones as being important in indicating the after-treatment, quoting briefly from the article by E. L. Keyes in Ashhurst's *Encyclopædia*, which is the most complete essay on the subject of stone I have been able to consult.

George Rainey first showed at St. Thomas' Hospital, in London, that certain crystalline materials assumed globular forms when precipitated in gummy solutions, and he announced his mature doctrine of "molecular coalescence and molecular disintegration" in an article in 1858 on the mode of formation of shells in animals. His researches led him to conclude that a law existed by which organized bodies assumed a rounded form on account of physical and not on account of vital agencies.

The following was Mr. Rainey's process: a solution of gum arabic saturated with a solution of carbonate of potassium of sp. gr. of 1.4 and two slips of glass which were introduced into the liquid, and the whole set aside for a month.

In this way he succeeded in forming perfect spheres of carbonate of lime, having all the hardness of pearls, and he demonstrated that they were built up by slow coalescence of minute molecules. Mr. Rainey concluded that the viscosity of the gum destroyed the polarity of the crystals, which would otherwise

form, and the molecules simply obeyed the law of mutual attraction and built themselves by fine concentric layers into spheres with which the gum was intermixed.

When these spheres are placed in a new solution of gum of different sp. gr. they lose their laminated arrangement, split radially and return to their molecular condition, a process termed by Mr. Rainey "molecular disintegration."

This splitting of a concretion in a fluid of a different sp. gr. from that in which it was formed is beautifully illustrative of what sometimes takes place in the human bladder in the spontaneous fracture of a stone.

Wm. M. Ord followed up Rainey's investigation with some excellent independent researches directed mainly toward investigating the formation of urinary and other calculi, publishing the final result of his labors in 1879 in a paper entitled "The Influence of Colloids upon Crystalline Form and Cohesion."

Dr. Ord's second proposition is the following:

A crystalloid is deposited from the solution in the presence of a colloid. This occurs in uric acid and urates mixed with albumin and mucus, in nitrate of urea crystallized from albuminous urine. His third proposition in part is that uric acid exists in three forms.

1. Rectangular oblong colorless plates, pure uric acid.
2. Rhombohedra and their modifications, urinary uric acid.
3. Spherical forms, calculous uric acid.

Ord states that number one is the proper crystalline form of uric acid, and that the changes in the form which the urinary crystals present are assumed in obedience to Rainey's law of molecular coalescence and vary with the quality and quantity of colloid substances which the urine contains.

Four substances in normal urine influence the forms of crystals; mucus, urea, extractive coloring matter, and salts; to these must be added the ingredients of pathologic urine, capable of modifying crystalline form: Albumin, sugar, blood and pus. Heat intensifies the action of a colloid, and a colloid in partial degeneration seems to be particularly active. Such a colloid is purulent mucus.

I have quoted this passage almost entire to show that we have the soundest scientific reason as well as our clinic experience urging the importance of getting rid of the muco-pus—that is, for treating the vesical catarrh after operations for stone in order to prevent recurrence of the stone. Indeed, those who have had most experience say that with proper after-treatment there are hardly any recurrences at all following litholapaxy. While we know that after the cutting operations, for secondary stones at least, recurrence may be said to be the rule. The reason for this, I think, is plain. In the first place, the idea of some, that the fragments left after the litholapaxy ought of necessity and do cause recurrence oftener than occur after the cutting operations is fallacious, because such fragments probably just as often remain after lithotomy, with this further fact against the latter, that the cut bladder is flaccid and paralyzed and has no power of cleansing itself, while the bladder after litholapaxy has more activity than normal, and will usually cleanse itself of all débris in a few days without artificial aid.

It is probable that in some cases the new stone begins to form after a cutting operation before the wound has closed, because of the vesical catarrh and the consequent muco-pus which clings to the walls of the bladder. It may form, too, upon the ragged edge of the wound or upon a stitch or a catheter left in the bladder; such rapid recurrences of course are confined to the secondary phosphatic stones due to vesical catarrh.

I have purposely confined this paper to the treatment of stone by litholapaxy, or rather to a plea for such treatment. I have said nothing of the history of the operation (which is the history of the evolution of the lithotrite), nor of the technique of the operation, both of which are very fully written of in all of the text-books. I only urge that the majority of stones met with in practice in this country can be removed with the lithotrite in the hands of ordinarily careful surgeons, and, while it is not an operation to be undertaken by the general practitioner, that no operating room should be without one; that the suffering and time spent in bed are almost entirely eliminated, and

that the mortality is very much lower than that for either of the cutting operations. Keegan says that in India crushing through a perineal incision will gradually take the place of suprapubic lithotomy in the larger number of those cases where the stone is encysted, or for other reasons cannot be crushed through the urethra; a small percentage will still be left, however, that are too hard to be crushed even then, and the suprapubic will be resorted to as a last choice. My time is too short and my experience has been too limited for me to say anything new on the details and technique of the operation, so I shall only refer you to the articles by E. L. Keyes, in Ashhurst's *Encyclopædia*, and by A. T. Cabot, in Morrow's *System*. Both are very full and satisfactory. I have one important exception to make to this, however, and that is the advice given in Cabot's article to tie a catheter in the bladder in cases with enlarged prostate where the bladder is not able to empty itself. It is just in these cases where a catheter will often act as a foreign body and cause a rapid deposit of lime salts. It would probably be much better to pass a catheter and wash the bladder out every hour than to leave one there for any length of time. It is unnecessary also for me to say much about the lithotrite, although a history of its evolution from the crude beginning of Civiale to the present day perfection is very interesting reading.

The present day instrument is really the invention of Horteloup, improved in a few minor ways by Bigelow, Thompson and others.

Bigelow's epoch-making discovery was, of course, the idea of crushing the stone and washing it out at one sitting.

Dr. W. S. Forbes, of Philadelphia, has made some systematic tests as to the amount of force necessary in crushing the different forms and sizes of stones. He found that of 300 stones a very small number required a crushing force of 200 pounds—only one went above 300—while a good-sized lithotrite is capable of exerting a pressure of 600 pounds.

Professor Forbes also has improved the lithotrite. His is perhaps the strongest that has yet been made, each instrument

is tested and the test number of pounds marked on the handle. It also by improvement in the fenestrum reduces to a minimum the clogging of the jaws when a soft stone is crushed. This clogging I found very annoying in my cases, because the instrument I have is not properly fenestrated. The authorities say that about five-sixths of all cases are hard primary acid stones. But in this country primary stone is rare, while secondary soft phosphatic stones, being due to vesical catarrh and foreign bodies, must constitute a large portion of the cases, because these causes are equally operative everywhere. This is a final point in favor of litholapaxy in this country—viz., that these soft secondary phosphatic stones occur most often in old men, and it is in old men that the mortality of the suprapubic operation is particularly high.

DISCUSSION.

Dr. F. W. McRea, of Atlanta, Ga.—Mr. President: I think Dr. Brown has brought up a subject of considerable interest and importance. I believe we do the cutting operation because it is more brilliant and much easier to do. My experience with litholapaxy embraces only two cases, but those were patients on whom I dreaded to do the cutting operation. One patient was a man, seventy-two years of age, upon whom I operated about three years ago. He was unwilling to have any cutting operation performed, and was also averse to taking an anæsthetic. I had not done it and had never seen it done, and only knew the operation by description. I did it under cocaine anæsthesia, being assisted by Drs. Elkin and Kennedy. The only difficulty experienced in doing the operation other than the time it took was the profound collapse which occurred soon after the commencement of the operation. This was due, I believe, to the rapid absorption of a 2 per cent. cocaine solution from the bladder. I crushed the stone in the bladder, the organ being distended with a 2 per cent. cocaine solution. I first put in four ounces of the cocaine solution, then distended the bladder with a 2 per cent. boric acid solution. The gentleman is now in good health, notwithstanding the fact that he has an enlarged prostate.

The other patient was a man, fifty years of age, who weighed 258 pounds. I did not feel like doing a suprapubic operation on such a subject. I therefore did a litholapaxy about eighteen months ago. He is now in excellent health, as I received a letter from him a few days ago.

I think the large majority of cases of stone in the bladder can better be treated by litholapaxy than by any other method. The results in the hands of all surgeons in young subjects show a mortality of less than 2 per cent. Dr. Keegan has done ninety-nine operations, consecutive, without a death, and several other surgeons have had almost as good results. With care, a surgeon with ordinary manipulative skill and a proper knowledge of the anatomy of the bladder, need not do any harm with a lithotrite if the precautions that are given for the use of this instrument are observed.

I do not see very many cases of stone in the bladder, and those that I have seen have been encountered unexpectedly, and I have been doing the suprapubic operation, as a rule. I have now all sizes of lithotrites, so that I can do the operation on a child three years of age.

Dr. John T. Wilson.—I would like to ask Dr. Brown if he has performed any of these operations without an anæsthetic, and those he has performed with an anæsthetic what anæsthetic he has used?

Dr. Brown (closing the discussion).—I did not make any attempt under the use of cocaine on account of having to use too much of it. Nothing less than a strong solution has much effect in the bladder, and it would take too much. I never use anything but ether. I do not use chloroform for anything under any circumstances. I always prefer ether.

TREATMENT OF RETRODISPLACEMENT OF THE UTERUS.

By I. L. Watkins, M.D.,
Montgomery, Ala.

To appear before this society with a subject so familiar to each of you, demands on my part some explanation; especially is this the case since I have nothing new or novel to offer, either in pathology or treatment.

The prevailing fashion now is to spend our time in discussing the more decidedly surgical subjects, and to overlook the minor things in gynecology. It may not be entirely unprofitable for us to turn our attention for a short time to the more commonplace things, such as we meet with daily in our offices. For this reason I hope to say something that will excite a free discussion of the treatment of retrodisplacement of the uterus.

It has been customary for the past half century for authors of works on gynecology to devote a great deal of space to this subject, and, almost without exception, it is safe to say that they all differ in some essential point as to the etiology or treatment. These differences can teach but one thing—namely, that our knowledge of this subject is yet defective.

The varieties of backward displacement are treated of under two heads — retroflection and retroversion. The varieties known as lateral deviation are unimportant. We may have temporarily a physiological displacement, as when the bladder is distended with urine the uterus is forced backward into the pelvis. With conditions favorable a sudden effort or fall is frequently a cause of this trouble. Prolonged dorsal decubitus,

as after parturition, is not infrequently the cause. This in connection with a subinvoluted organ is very apt to result in retroflexion. Inflammatory deposits, shortening the sacral ligament and destroying the natural tonicity of other muscular fibres, will result in this condition. Still another cause, and one which I have not seen mentioned in the books, is imperfectly developed broad, sacral and round ligaments with infantile generative organs. These cases are usually found in young girls or married women who have not borne children. For want of tonicity in the pelvic muscular tissue the organ settles backward, either bent on itself, or otherwise, into the hollow of the sacrum. The condition is very similar to that following the operation of oöphorosalpingectomy. As a result of this we have irregular menstruation, soon followed by endometritis, the uterus limited in its movements and pressing on the sacral nerve. I have frequently noticed this condition following the removal of the ovaries and tubes. And in my opinion many of the annoying symptoms which are kept up so long are indirectly caused by this condition. Inflammatory deposits of either of the prominent ligaments, leaving them shortened, will, of course, produce a similar condition.

As to the cause of symptoms in displacements, whether due to pressure on the sacral nerves or drawing on others, I will not attempt to say. It is most likely that it is due to some influence on the circulation in these tissues. Too much importance cannot be attached to faulty nutrition while considering the causes of any displacement of the uterus. Symptoms of uterine displacement are largely determined by the cause of the deviation. Those due to inflammatory deposits in the ligaments are accompanied by pain through the hips, lower part of the abdomen, and back. Reflex disturbances are common; indigestion, constipation, and palpitation of the heart are among the most common. Those due to falls or jars are usually headaches, pain in the back, legs, and hemorrhoids. Displacements due to imperfect developments of the fibrous structure of the pelvic tissue are usually found, as I have stated above, in young girls or women who have not borne children. They are

highly hysterical, and are subjected to a long list of imaginary troubles bordering on insanity: dyspepsia, headaches, constipation, and moments of depression bordering on melancholia; menstruation is irregular, when it occurs is painful and scant; on examination the os is found patulous; the cervix soft and flabby; the fundus and ovaries are low down in the cul-de-sac of Douglas; the endometrium is inflamed, usually not much above the internal os. They rarely have leucorrhœa. On passing the sound it usually extends further than was expected. Its removal is followed by the passage of a few drops of blood. This little operation, as a rule, is very painful. I am aware that endometritis is put down as one of the causes of displacement, but instead in a large number of cases the endometritis is caused by the displacement. Cases coming with a history of long standing show a greater degree of endometrial trouble than those of shorter duration. Sooner or later many of these patients become masturbators.

The diagnosis of backward displacement is, as a rule, very easy, but it is not always easy to determine the cause in a given case. The cervix is found pointing toward the vaginal outlet, and the fundus with one or both ovaries in Douglas' cul-de-sac. With one or two fingers against the cervix, the opposite hand on the abdomen, the organ is raised, the fundus distinctly felt if it occupies the normal anteflexed position. Failing in this the passage of the sound gives unmistakable evidence as to its location. This is rarely necessary when the bimanual manipulations are carefully conducted.

As I have stated above, the treatment of these displacements is by no means settled. Before the days of antiseptic surgery, relief from this condition was sought for by the use of pessaries. The styles and varieties were legion. Without a very accurate knowledge of the existing condition every gynecologist felt called upon to invent some peculiar instrument to meet the indications. Hence, the average professor when called upon to lecture on this subject was forced to use not less than a bushel basket to bring his pessaries before the class, in order to show the different varieties on the market. To-day it is

somebody's peculiar operation. So, notwithstanding the great progress made in the last few years, the subject of this treatment is yet unsettled. The question as to the best method of correcting this condition is magnified out of all reason in the average text-book. With the patient on her back, on a suitable table, with two fingers in the vagina, it is in a large percentage of cases very easy to raise the fundus to the normal position. When the sacral promontory is very prominent, a tenaculum hooked into the cervix to draw the organ down from under it may be necessary. When with these manipulations failure results it is usually due to some adhesions which are contraindications to further efforts. In determining the best method of treatment in a given case it is well if possible to determine the cause of the condition, as this may decide the question of success or failure. In addition to this there are several questions which should be answered before treatment is undertaken. First, is there any disease of the pelvic organs that would be benefited by operative measures? Second, is it a case where a pessary can be fitted without difficulty? Third, can the patient have intelligent medical care while wearing the instrument? Fourth, is she willing to give the time necessary for her recovery? With diseased appendages they should be removed and the fundus suspended from the abdominal wall. If impossible to fit a pessary, this operation should be resorted to, otherwise your patient will not appreciate your efforts, and she will justly look for someone who will operate. It is unwise to send a patient away where she will not be looked after, as too long or improper use of this instrument will produce damage which will be charged to the one who inserted it. As to the time necessary to wear a pessary for relief, I never attempt to say. At intervals of three or six months I remove it for a few days; if the organ remains in position I discharge the patient.

The best instrument is a hard-rubber Hodge, which is susceptible to slight changes by oiling and holding over the alcohol flame. This in my hands answers every purpose, and should be introduced with patient on her back. When endometritis, laceration of the cervix with glandular infiltration exist,

curettement and amputation of the cervix should be performed. These conditions should, of course, be corrected, whatever method is resorted to. Where strong adhesions or other intra-pelvic complications exist the use of the pessary is not to be considered. The abdomen should be opened, adhesions broken up, neoplasms removed, the organ anteflexed and attached to the abdominal wall. In the case of illy-developed fibrous structure it is far better to suspend the organ than to attempt to correct it by the use of an instrument. These cases, as a rule, bear pessaries badly, but show marked relief when subjected to a careful operation.

I do not feel justified in taking up your time discussing the numerous operations that have been advocated by their various authors in the past few years. Many of them were conceived in sin, and are not worthy of the age in which they exist. The Alexander operation, so popular in this country, is a much-abused operation. It doubtless has a place in the list, but the cases to which it is adapted should be selected with care. It is difficult to perform, and a large number of reported successes are incorrect. I have done ventral suspension on a woman on which Alexander's had been performed, finding the uterus thoroughly retroflexed. Doubtless others of you have done the same thing. The objections so frequently raised to suspension are, as a rule, due to faulty technique. Difficulty during labor and interference with the bladder are the result of including too much uterine tissue antero-posteriorly, and limiting too much the upward and downward movement of the organ. I have never seen any difficulty during labor after this operation, when it has been performed according to the methods laid down by Dr. Kelly.

DISCUSSION.

Dr. George H. Noble, of Atlanta, Georgia.—Mr. President: Every man who does gynecological work has this question before him. The successful management of retrodisplacements of the uterus depends upon many things. The pessary is much abused,

not that it is at fault, but its faulty application. For the successful use of the instrument there are several things to be considered. First, the patient must be practically well before she can wear it. Diseased appendages, old adhesions, etc., are positive contraindications to the use of a pessary. Even disease of the rectum, hyperæsthesia and ulcerative conditions of these parts forbid its use. Again, it requires a certain amount of mechanical tact to shape and mould the instrument as it should be. It is a rare thing to find a pessary, such as are in the market, that will fit a fair percentage of cases. Even the slightest bend will create a disproportion or disturbance; some little knuckle or slight curve near the urethra or higher up may create pressure on either side of the rectum and create a great deal of discomfort elsewhere, whereas shortening the instrument one-eighth to one-fourth of an inch may give perfect relief. It is, therefore, a question largely of accurate fitting. We must consider the anatomy of the part. If there is much subinvolution of the vagina, we may fit the pessary with perfect comfort, but, perhaps, in a few weeks be forced to remove it and introduce a small one, on account of the reduction in the size of the vagina and weight of the uterus. Frequently we observe a marked reduction in the size of the uterus where there is much swelling from the displacement. It is a common observation that an organ, perhaps two-thirds the size of the fist, due to engorgement and venous stasis, will reduce in twenty-four hours 50 per cent. after replacement of the uterus. Surely, you all have seen this. We get a great deal of assistance in the treatment of these cases by early replacement of the uterus where it is practicable. But, as before stated, a patient to wear this instrument satisfactorily or with comfort and relief, she must be practically well. She must be taught to remove it and to reintroduce it. If the soft parts are relaxed, if the organ is heavy, she cannot do this at once. It should be in use five or six months before she can manipulate it properly. If an attempt is made earlier to teach her to remove and reintroduce the instrument, the organ becomes displaced, the upper extremity passes in front of the uterus and forces it back. A great many general practitioners who use the pessary will introduce it and say to the patient, "You must wear it." Patients complain that it gives them pain, and the practitioner says, "I can't help it; that is what you need." This is a

mistake. If a woman feels the instrument (after it has been introduced) in the slightest, there is something wrong. The woman is either not in a condition to wear it or it does not fit. We should select our cases for their use, and a great deal of our success will depend upon the selection. The same is true of operative measures. We should select the case and the operation best suited to the case. Ventrosuspension with buried suture is a practical measure. I prefer to do it when the uterus is not functionally active or when the appendages have been removed. I now make it common practice to suspend the uterus when I have removed the appendages in cases with chronic displacement, because I have seen so many instances of chronic hysterical conditions remaining over for not only months, but for several years, that were due to prolapse or retroversion of the uterus without the appendages. Some of our friends are prejudiced against any form of suspension of the uterus. They claim to open the abdomen and cut through this pedicle and release the uterus. I have had under my observation cases of these men in which the uterus has been left displaced and where their patients have failed to get benefit from the removal of the appendages. I have replaced the uterus by means of pessaries and made them comfortable. A case I have in mind had a laceration of the perineum. Her appendages were removed in a Northern city without relief. I fitted a pessary which gave great relief, but she would tire of its use and would remove it, when all the old symptoms would return, all of which could have been prevented by retrosuspension. While we are speaking of the pessary, I neglected to say one thing in my previous remarks with reference to the selection of cases. We cannot satisfactorily fit hospital cases with them. Workingwomen will not wear nor take care of them, so I find it more satisfactory to do some one of the many operations in this class of patients.

The operation I do in these cases is a little different from that which the doctor has described. Some of us like to introduce slight modifications of our own, and to this I must plead guilty. The operation I have resorted to in these cases during the past six years has been very satisfactory. I believe I published it in the *Atlanta Journal* some two or three months ago. (Here Dr. Noble demonstrated his method diagrammatically of operating on retrodisplacements of the uterus.)

Dr. Hugh M. Taylor, of Richmond, Virginia.—It seems to me that there are few subjects that come before the Association which are of more importance than how to deal with retro-displacements of the uterus. Each of us has to deal with a number of these cases from time to time, and to my mind the proper treatment is far from being settled. I am as much embarrassed sometimes in dealing with these cases as is the tyro in medicine, and after listening to the discussion one must go away with a confused idea of what is best to do for this class of cases. I must confess that I have not mastered the science of using the pessary to great advantage. I have failed in accomplishing good with it. It is perhaps my own fault because so many excellent men say they accomplish good with these instruments.

I have not mastered the technique of suspending the uterus to the abdominal wall and securing satisfactory results. That may also be my own fault, but it is nevertheless a fact. I have accomplished a good deal of good with the Alexander operation, in that a great many cases cease to trouble me afterward. I have attended several women in confinement after this operation and have found the uterus in good condition after confinement. Therefore, I favor the Alexander operation, and I have within the past two years practised it exclusively. I do not regard it as a difficult operation; it was somewhat difficult when I began to do it, but this difficulty becomes less with every year of experience.

There are great drawbacks to the Alexander operation, and one of which I have overcome by increased experience. At first I was never absolutely certain as to the condition of the pelvic organs when I did an Alexander operation; in other words, I could not recognize slight changes in the tubes and ovaries and possible adhesions. I made one or two mistakes in that particular in my early experience with the method. In one instance the uterus was adherent to the rectum. The long mesorectum enabled me to lift the uterus up, and I thought I had it in position; when I shortened the round ligaments, the operation was a failure, and a subsequent cœliotomy revealed the uterus adherent to the rectum, necessitating a secondary operation. In another instance the tube and ovary were adherent posteriorly, and the operation was a failure. A second operation was done in this case to liberate adhesions. Since then I have

been opening the internal abdominal ring and passing my finger into the pelvis to ascertain the condition of affairs. In one instance I removed through the inguinal canal a little cyst; in another case I removed the tube and ovary that were damaged. A distinguished clinician of New York found in the Hospital for Ruptured and Crippled twenty-five cases of hernia following the Alexander operation. The majority of these cases occurred before the improved technique of closing the inguinal canal. There is a similarity between the Alexander operation in splitting up the inguinal canal and the Bassini operation, so that I cannot understand why the Bassini method is resorted to to prevent hernia, and the Alexander operation results in a hernia. The latter has no compressed and atrophied tissues. Of course, my experience with the Alexander operation has been limited, but in the last two years I have done it twenty-five times. There are surgeons who count their cases by the hundreds, and who do not have hernia to any extent after this method. I have not seen a hernia following the operation myself. I have accomplished excellent results with it. It is easy of execution.

Dr. Samuel E. Milliken, of Dallas, Texas.—In reference to Dr. Taylor's remarks, I wish to say that I have never done the Alexander operation, but am willing to admit that I am a little prejudiced against it. At the New York Hospital for Ruptured and Crippled I witnessed a great many cases of ventral hernia following this operation. I cannot say as to ventral hernia following the Alexander operation with the improved technique. I do believe, however, that the reason why we should have more herniæ following the Alexander than from the Bassini hernia operation is the natural tension we would expect on the posterior inguinal wall in the former. The obliquity is tested in a measure by the additional tension exerted by the round ligaments, and it seems to me we would be more liable to have a hernia following the Alexander operation than is the case with the Bassini method.

Dr. Watkins (closing the discussion).—I wish to thank Dr. Noble for presenting his operation in connection with the discussion on my paper. I was very much interested in it, and, as I stated, almost everyone has peculiar ideas in doing the Alexander operation. I have not been very successful with it, and it has not been in my hands a satisfactory operative procedure. I prefer ventrosuspension, and I see no special objection to it.

One objection to the round ligament operation is the roundabout way in which we get at the organ in order to obtain very slight effects. The normally-sized uterus does not require any special effort to hold it in position.

As to the use of the pessary, Dr. Noble spoke of the necessity of the pessary fitting perfectly. The idea of holding the normal-sized uterus in position does not really require any force on the part of the pessary; it has only to occupy the position in which the organ is inclined. A pessary should fit with sufficient tightness to retain it in this position, and any force brought to bear on the organ by the maladjustment of the instrument would do harm. No woman could bear it. Pessaries under those circumstances are very useful. It seems to me that some of the damages that have been reported on this floor since I have been in attendance are due in a measure to the improper use or adjustment of pessaries. The fact that so good a man as Dr. Taylor condemns them rather convinces me that the men who use pessaries imperfectly get such results as he has mentioned. If pessaries are no good, they should be discarded. On the other hand, the practitioners who have not the facilities or requisite skill for doing surgical work on these cases will resort to the use of these instruments with advantage. Personally, I think the pessary has a place in displacements of the uterus, but I am satisfied errors are made in selecting the cases in which to use them.

The operation Dr. Taylor does is not the Alexander operation. I do not see any good reason for inflicting so much traumatism when the same and more certain results can be obtained with half the work.

REPORT OF CASES OF SPINAL INJURY TREATED AT THE CHARITY HOSPITAL, NEW ORLEANS, DURING 1899.

By E. D. Fenner, M.D.,
New Orleans.

In looking over the records of the Charity Hospital for 1899, I have been able to find reports, more or less complete, of fifteen cases of spinal injuries. The following is a summary of the history of these cases:

Case I.—John N., white, aged forty-four years; admitted May 16, 1899; contusion of lumbar region; partial paraplegia. Discharged, improved, May 22, 1899.

Case II.—Henry D., white, aged thirty years; admitted May 16, 1899; fracture dislocations of third cervical vertebra. Discharged May 17, 1899.

This young man was found upon the street, unconscious, by the police. Suspecting something more than alcoholism, the ambulance was summoned and he was sent to the hospital. On his arrival he had regained consciousness, but was very boisterous, throwing himself about and behaving generally like a man far gone in liquor, which indeed he was. Pain and tenderness in the neck indicated an injury in the cervical region, and he was put to bed with a sand-bag on either side of his head. Next day a fracture, with some displacement of the bone, was readily made out. Chloroform was given, the neck stretched and a plaster-of-Paris collar applied. He presented at this time paresis of the right upper extremity and complained a great deal of pain in his neck. He was taken to his home, where I am informed after a time a Davis wry-neck brace was

substituted for the collar. In the course of six weeks he was able to discard the support and now appears to be entirely well, except for some deformity at the seat of injury and some stiffness of the neck. In what manner the injury was received we have never been able to discover.

CASE III.—Louise C., white child, admitted May 25, 1899; died within an hour; extensive fracture of vault and base of skull; fracture third cervical vertebra.

CASE IV.—Henry C., admitted May 31, 1899; died June 7, 1899; gunshot wound of chest and spine; paraplegia.

CASE V.—Lucie D., aged eighty years; admitted June 14, 1899; died June 21, 1899; cervical spinal injury; paraplegia.

CASE VI.—Manuel B., admitted August 29, 1899; fracture of lamina of third dorsal; dorso-lumbar dislocation. In attempting to board a freight train he was thrown violently against the side of the station platform, striking his back and head. The ambulance conveyed him to the hospital.

Examination revealed pain and tenderness in the back and legs. Motion and sensation were not impaired, but a fracture of the third dorsal lamina and a dorso-lumbar dislocation of the spine were found. He was put to bed with one long, narrow sand-bag beneath the back and two others on either side.

Four days later, under chloroform anæsthesia, it was attempted to reduce the dislocation, and a plaster cast was applied. The patient was exceedingly restless, and in the course of a week had torn the cast to pieces. For two weeks he was left without any support, being simply confined to bed. But as he suffered considerably with his back, a new cast was at this time applied. This relieved his pain, and was worn for about four weeks. He then got about without support for a time, but complained of pain after being up for a few hours. On November 22 a new cast was applied, which at once relieved his suffering, and he now goes about without any trouble. A distinct irregularity in the spinous processes is evident at the seat of the dislocation.

Case VII.—Peter A., colored, aged sixty-three; admitted August 30, 1899; died September 3, 1899; injury: cervical vertebra, paraplegia, Pott's fracture of ankle.

Case VIII.—Sidney L., white, aged seven years; admitted September 2, 1899; Discharged September 28, 1899; fracture: dislocation third cervical vertebra. This child fell from a gallery fifteen feet high, striking upon his head and shoulders. He suffered a subcoracoid dislocation of the left shoulder and fracture of the third cervical. The grating of the lamina could be distinctly felt and projection of the displaced vertebral body could be detected by the finger in the pharynx. There were no paralytic symptoms. Under chloroform the displacement was corrected, and the neck put up in a plaster cast, which included the injured shoulder. Recovery was uneventful and the child was discharged apparently entirely well.

Case IX.—Alex. G., admitted September 22, 1899; died October 1, 1899; subluxation lumbar vertebra.

Case X.—James C., aged twenty-six years; admitted September 4, 1899; discharged October 1, 1899; subluxation dorsal vertebra, paraplegia.

Case XI.—William J., aged sixty-three years; admitted September 5, 1899; died September 27, 1899; fracture of fifth cervical vertebra.

Case XII.—Adolph T., admitted September 25, 1899; discharged November 10, 1899; fracture of lamina lumbar spine, hæmaturia. This man had partial paralysis of the left lower extremity, which, together with the hæmaturia, gradually disappeared under treatment of recumbency.

Case XIII.—John A. W., admitted October 17, 1899; discharged stationary October 20, 1899; fracture of dorsal vertebra.

Case XIV.—Jno. W., admitted October 24, 1899; died November 1, 1899; fracture of fourth lumbar, laminectomy. This man was engaged in chopping down a tree when it fell, striking him across the small of the back. He became unconscious, and when he regained his senses he found himself com-

pletely paralyzed from the waist down. Upon his arrival at the hospital we found a fracture of the fourth lumbar, with marked displacement of the column.

He was put to bed, and on October 25 a laminectomy was done by Dr. Bloom, assisted by myself and the interne staff. Upon exposing the vertebral arches by the usual median incision, a fracture of the lamina of the fourth lumbar was found and this arch was removed with trephine and rongeur forceps. The cord was exposed and found to have been partly cut in two, but without injury to the membranes. The body of the vertebra was found to have been fractured and the two segments of the spinal column were freely movable upon one another. A sharp fragment of the broken body projected into the spinal canal, pressing against the cord. This was removed, the displacement corrected as far as possible, the wound sutured, and a plaster cast applied. Next morning sensation was restored in both legs and motion slightly restored in the left foot. The urine, which had to be drawn, contained blood, evidently from the kidney, and soon became very offensive.

Third day after the operation: Temperature has been persistently high. Intestinal paresis, with tympanites; hiccough and delirium have set in. Coma gradually developed and the patient died on the sixth day.

Case XV.—Rosario F., aged twenty-eight years; admitted November 7, 1899. Fell from a platform in a saw-mill and was struck across the back by a log; complete paraplegia; dislocated fracture about eighth dorsal. Under chloroform reduction attempted and partly successful; plaster cast applied; no improvement of condition; fever quickly developed; bedsores formed in a few days; urine decomposing in the paralyzed bladder. Cast removed at the end of a week to reveal pressure sores beneath the cast at the region of spinal injury. This man now lies in bed with paralysis of the sphincters of bladder and rectum, and complete paraplegia from the level of the umbilicus. There is distinct girdle sensation and a zone of hyperæsthesia. He is surely doomed to death by exhaustion and sepsis.

An analysis of these cases brings out the following points:

The diagnoses are variously recorded as: Fractures, dislocations, or fracture-dislocations. In most of the cases the injury was probably both a fracture and a dislocation, the heavy covering of soft parts serving in some of the cases to mask one or the other lesion, so that it was not recorded. As might be expected, these injuries were all the result of extreme violence, sometimes direct, sometimes indirect. For instance, I find among the causes: "A fall upon the head and shoulders from a height of fifteen feet;" "struck by a falling tree in the small of the back;" "thrown from a train, striking side of station platform with small of back."

Of the fifteen cases seven were fatal, generally in a few days. In one case (Case VIII.) the spinal injury was complicated by, or might be considered a complication of, extensive fracture of the vault and base of the skull, and death occurred within an hour or two from the immediate shock of the injury.

In the list of fatal cases are included all the cases in which there was paraplegia except four. Of these four, one was a partial paraplegia following contusion of the back; one is still in the hospital completely paralyzed from the waist down, with extensive bed-sores and a surely fatal prognosis; and two were taken home still paraplegic and have in all probability succumbed since their removal to their homes. The mortality may then be reckoned as ten out of fifteen—66.7 per cent.

The cases having a favorable termination presented physical evidences of injury to the spinal column, but were not attended by apparent damage to the spinal cord, with the exception of one case (Case II.), in which there was partial paralysis (paresis) of one arm, and in which the diagnosis of vertebral injury has been confirmed by the deformity which still remains.

As evidence of the relative vulnerability of the regions of the spinal column, I find that of the fifteen cases the lesion was located as follows: Cervical, 6; dorsal, 4; dorsal and dorso-lumbar, 1; lumbar, 4.

Our rules for the treatment of these cases at the Charity Hospital are simple. In cases presenting evidence of displace-

ment we endeavor to reduce the deformity under anæsthesia, and then secure immobility by the application of a plaster cast or collar. Not frequently do we resort to laminectomy. During 1899 but once was this measure tried, and in this case, as has been the experience here in the past, the termination has been fatal. I am not aware of any case dying during or as an immediate result of the operation itself, but in our hands it has not seemed to favorably influence the progress of the cases in any way. In the laminectomy reported in this series it is noticeable that some return of sensation and motion followed the operation, but the general progress of the case toward death was not affected.

In this connection it is interesting to review the recent expressions of prominent surgeons upon the subject of the operative treatment of these spinal injuries, and to note that the concensus of opinion seems to be the same in all of them.

The *Annals of Surgery* for August, 1899, contains an article by Percival R. Bolton, in which, after reviewing the various forms of injury to which the spinal cord is liable as a result of such traumatism, he announces the following conclusions:

"1. Extradural hemorrhage does not give rise to cord lesions or symptoms, and requires no treatment.

"2. Total lesions of the cord are irremediable . . . and require no treatment.

"3. In hæmatomyelia the clot is absorbed. . . . There may be great amelioration of the symptoms; there is therefore no therapeutic indication and no remedial treatment is possible.

"4. In partial contusion . . . no treatment is available.

"5. In open injuries of the cord . . . active operation in preference is indicated to remove foreign bodies to facilitate disinfection, to prevent more extensive necrosis, and facilitate drainage."

In the discussion upon the paper which followed at the meeting of the New York Surgical Society, Dr. L. A. Stimson thought that very few cases of fracture-dislocation could be benefited by operation. Dr. Robert Abbe had seen no benefit from any of the eighteen operations he had performed, with

one solitary exception. Other members expressed themselves to the same effect.

These are exactly the deductions we have been forced to draw from our experience here, and it would seem that the outlook from operative intervention in these cases is very bad.

DISCUSSION.

Dr. William E. Parker, of New Orleans, La.—I have had only a limited experience with spinal injuries, but it is a line of work which is of interest to all general surgeons. I am inclined to agree with Dr. Fenner as to the prognosis he gives of these cases. I do not know just how many, but during the time I was in the Charity Hospital I saw many cases of fracture of the vertebræ. During that time I did a laminectomy on three cases, and made up my mind then that it was not worth while to operate on such cases, as a rule. In those three cases the cord was very much crushed. None of the patients operated upon lived as long as those that were not operated on, and for whom nothing practically was done. I do not believe laminectomy helps these cases materially, and it is not an operative procedure for us to advise and urge in a large proportion of cases. In those cases where the cord is uninjured, I believe they can be helped as much without operation as with it. Last year, in the paper that I read before this Association, in speaking of a case of gunshot wound of the spine that I had seen and that struck me as being one of the favorable cases for operation, I said that I did not believe an operation in cases of gunshot wound of the spine promised much, as a rule. There are times, however, when we should try the operation, particularly in those cases where there is not much destruction of cord tissue. My experience in resorting to laminectomy for fracture of the vertebræ has not been favorable.

Dr. John D. S. Davis, of Birmingham, Ala.—This is a very interesting paper, and it demonstrates that in nearly all of those cases in which the cord is injured, in fractures of the vertebræ, operative intervention does very little good. We have had several recoveries in our district in cases of fracture of the vertebræ, from operation, but the cord was not seriously injured in any of them. The majority of injuries that are received in our

district are sustained in the mines in the sitting posture, the dorsal region being most frequently affected, and some of these patients get well. A large percentage of them are able to go about on crutches, but where the cord is injured they die regardless of operation. I have a case in mind of gunshot fracture of the fourth cervical vertebra, treated in the same way as the case reported by the doctor, in which he applied a plaster support, and the man recovered from a paralysis of the left forearm. I had a case recently of fracture of the eleventh dorsal vertebra. In this case I do not think the cord was seriously injured, although both legs were completely paralyzed. The man was treated by a plaster support, after reducing the fragments under anæsthesia, and was kept in the recumbent position for nine weeks. I might say, too, that he also had a compound comminuted fracture of the leg, and was first dressed by a former assistant of mine, and I did not see him until several days after the injury. Union failed to take place; necrosis resulted, and I dissected the bones and united them with silver plate, following which there was union by first intention, and the man got well. He is now on crutches, sensation has been completely restored, but there is more or less feebleness and some tottering in his gait.

I want to indorse most emphatically the results as detailed by the essayist, and agree with him that in the majority of cases these injuries are going to prove fatal.

The doctor spoke of the extreme difficulty in differentiating between a fracture and dislocation of the vertebræ. The majority of injuries that we see in our district are fractures, because they are sustained in the manner I have designated. In those cases in which the muscular structures are heavy, an incision will enable us sometimes to diagnose a dislocation where we would not be able to do it without. I do not advise this, as a rule, but in two cases I was able to make a diagnosis of dislocation where otherwise I could not do so.

Dr. George A. Baxter, of Chattanooga, Tenn.—I regret that I did not hear this paper. Judging from the discussions I have heard, it dealt with spinal injuries. I recall the case of a man who fell from a buggy and fractured the third and fourth cervical vertebræ, with rapidly increasing total paraplegia. The temperature rose to 109.4° in the course of a few hours, and death resulted. Post-mortem disclosed a fracture of one of the

laminæ, not greatly displaced, with a marked increase of serosanguineous fluid in the upper portion of the meninges at this point. Here was a case, if I had recognized the exact condition, in which I would have been justified not only in attempting to replace the fragments, but in evacuating the constantly increasing fluid for relief by puncture. I failed to do this, and the patient died.

I have seen several cases of extensive fracture of the spine occurring in men in mines from the fall of slate, with crushing injury of the vertebræ. I saw a case recently of this kind, with total paraplegia. In such cases it is almost impossible to accomplish any good by operation. In my opinion, these fractures are generally too extensive, and the destruction of the cord so great, and the injury to the meninges so serious, that operative interference is out of the question. In the case that I saw recently, a week or so after the first injury, the general condition of the patient was such as to contraindicate operative procedures. I have noticed that decubital sores appear much more rapidly in this class of cases than in others; that they occur more frequently below the point of injury than above. I have ascribed this to a lowered condition of vitality of the injury itself. I have never seen a case of spinal injury in which I have felt justified in encasing it in plaster. As operative procedures in these cases offer so little hope of recovery, I prefer to place the patient in as comfortable a position as possible and await the final result.

In one case of suspected fracture, not positively determined, but with inability to move the patient in any direction, I put him upon a plank and suspended him in an upright position, the only method I could then devise for his comfort. The case turned out to be one of neither a fracture nor a dislocation, but possibly a localized congestion from injury.

Dr. W. P. Nicolson, of Atlanta, Ga.—I have seen a number of fractures and dislocations of the spinal column, although my experience with laminectomy has been limited. I have not been impressed favorably with this operation, even in those cases in which I have seen it done by other surgeons. I have seen laminectomy done on two occasions where it was demonstrated that no special good was accomplished by it. Most persons who receive injuries of this character are those who have strong muscular development in the muscles of the back, who do a great deal of lifting, etc., so that laminectomy is one of the most diffi-

cult operations that I know of in surgery. I regard fractures of the spine in any region as unfavorable for operation. I have seen fractures high up in the cervical region and in the lumbar region, and they have all uniformly progressed to a fatal termination, with the exception of two cases.

A patient was brought to me late after receiving an injury in which the spinuous processes were driven in on the cord, and I believe that if this case had been operated upon at the beginning some good might have been accomplished. When the patient was brought to me, there were such serious atrophic changes, which had existed for two years, that an operation was declined on that account.

As a general proposition, I do not know that I have seen any great good from the application of plaster-of-Paris in these cases. Patients seem to do just as well by lying in bed on their backs as they do when encased in a plaster-of-Paris jacket.

I am sorry that I have nothing more cheery to contribute to this discussion, but my experience has been uniformly discouraging as regards operative intervention in this class of cases.

Dr. Fenner (closing the discussion).—I would like to say in regard to the application of plaster-of-Paris in these cases, that I was especially struck, in collecting the cases we have treated, with the fact that all of them who presented injuries of the spinal cord died. Those in whom we employed plaster-of-Paris presented the physical signs of injury of the bones of the column unassociated with spinal cord injury, and in those cases by applying the plaster-of-Paris bandage we simply carried out the old surgical maxim of obtaining rest and support to the injured structures. I have not experienced any inconvenience in applying plaster casts to patients in the recumbent posture. A simple method of applying plaster bandages consists in stretching a piece of cloth, cotton, or some such material across the frame, laying the patient upon this, cutting slits along either side of the body, applying bandages around the body, including a portion of the cloth upon which the patient lies. We have a table at present which we are about to put in use in the new hospital for the treatment of spinal diseases. We have not employed it in the main surgical amphitheatre, but I refer to blocks in place of large tables, these being good substitutes.

PERITONITIS, WITH PERFORATION OF SMALL INTESTINE. GUNSHOT WOUND OF THE ABDOMEN, WITH THIRTEEN PERFORATIONS.

By T. J. Crofford, M.D.,
Memphis, Tenn.

Mrs. W., aged fifty-eight, who had previously been in good health, was suddenly attacked with abdominal pain, October, 1897, which proved to be peritonitis. The acuteness of the attack passed away, but a chronic inflammation lingered, which, together with the adhesions that had formed, kept her constantly in more or less pain, which was always increased by moderate exercise and made unendurable by violent exertion, as by driving in a carriage, buggy, or by any exercise that jostled or called forth an effort. I saw her with her physician about February 25, 1898. Upon examination through the abdominal walls, or through the vagina, we could make out no enlargement or growth within the abdomen, but on account of the constant pain and a frequent gaseous distention which the patient experienced we determined to operate. So ten days later, she having been brought up to me, the abdomen was opened in the median line. The greater omentum was almost universally adherent to the intestines, the appendix vermiformis, the bladder, the uterus and in some places to the parietal peritoneum. After liberating the adhesions a perforation in the small intestine was found some three feet or more below the stomach. This opening was stitched up with fine silk by the employment of the Lembert suture. The ragged portions of the omentum, after being ligated *en masse*, were

pared off. The abdomen was now cleansed by irrigation with sterilized water and closed, a glass drainage-tube having been left in the lower end of the incision, reaching the most dependent portion of the pelvis. Her recovery was uneventful. She has not been restored to perfect health ; she is not able to take active exercise without experiencing more or less pain thereafter. She writes me six months since that, while she experiences more or less pain daily, she has increased in weight from 104 to 136 pounds. She is in good spirits, and believes that she will be ultimately entirely cured. It is my impression that the pain is due to adhesions which formed in the repair following the operation. I am not able to assure her that she will be restored to perfect health, but believe that she will.

This is the first intestinal perforation that I have ever known to which I was not able to assign a cause. I have no means of determining the cause of this perforation.

For some time pathologists have been telling us there is no such thing as idiopathic peritonitis, that the foci of inflammation are the tubes and ovaries, the appendix vermiformis, and the liver with its gall-bladder and ducts.

The writer reported, some years ago, the result of a post-mortem in a boy of twelve or fourteen years which revealed two perforations of the small intestines. There were two large lumbricoid worms in the free peritoneal cavity near the liver. The boy was well and active up to three days prior to his death. His illness came on suddenly with the symptoms of acute peritonitis. The post-mortem verified the correctness of the diagnosis.

These cases may be taken in proof of there being other sources of peritonitis than those emanating from the above-named foci.

Mrs. A., aged twenty-five years, was shot in the abdomen at a distance of four feet by the accidental discharge of a 32-calibre Smith & Wesson pistol in the hands of her husband. The ball entered the abdominal cavity just to the right of the median line and about one inch below the umbilicus.

This occurred on April 24, 1897, at about 7 A.M. I saw

her one hour later. She was suffering much pain. Her pulse was rapid, but of reasonably fair volume. Her face was pinched, and other symptoms indicative of shock and hemorrhage. An immediate laparotomy was proposed. This was accepted.

The hygienic surroundings were not good, and the room was rather poorly lighted, but we did not think it advisable to move her. The patient was put on the table under ether anæsthesia at 11 o'clock, about four hours after the shooting took place.

The abdomen was laid open by a four-inch incision. The intestines were examined in their entirety with great care, each part after examination being laid without the cavity and protected by warm sterilized gauze towels. There were found thirteen perforations, eleven being in the ileum and duodenum, while two were in the mesentery. The colon was uninjured. Frequent blood clots were encountered, showing that hemorrhage had been free. Each perforation as it was found was closed with Lembert sutures of fine silk, after which the cavity was washed out thoroughly. The intestines were replaced and the incision closed, a glass drainage tube reaching to the bottom of the pelvis having been left in the lower angle of the incision.

The shock from the operation was not profound. At 4 P.M. the temperature reached 103.2°, the pulse 120, but of fair volume. This temperature was in all probability due to absorption within the cavity. It rapidly declined, and by the next morning was practically normal.

The bowels were now moved by the administration of calomel and salines, and, notwithstanding the many perforations, no trouble was experienced on account of leakage. The drainage was moderate; the tube was removed after forty-eight hours. Her temperature did not rise more than one degree after this. Convalescence was rapid and recovery uneventful.

A few months later she became pregnant, the history of which presented nothing worthy of special consideration.

On June 15, 1898, she was delivered of a large baby at term. She was in good health when I last heard from her, which was about one year ago. The family moved away.

DISCUSSION.

Dr. F. W. McRae, of Atlanta, Georgia.—Mr. President: I wish to say a word or two with reference to the technique pursued in regard to the abdominal case. While the result was most excellent, my impression is that bringing out the intestines is a very serious procedure, and personally I would take exception to that point in the technique of the operation. My own practice is to slip a little bit of gauze through the mesentery, tied around the bowel, make a cross on one side or the other, follow the bowel up, keeping it constantly in the abdominal cavity; after I get to the end of it in one direction I drop it back, get hold of the tape and follow the bowel in the opposite direction, with little exposure and very little trauma. In this way the danger of shock can be lessened.

Dr. Manning Simons, of Charleston, S. C.—In the first place, I would like to ask Dr. Crofford how soon after the accident he saw the patient. Second, whether he found any evidence of peritonitis. Third, whether he closed the wounds in the intestines in the long axis of the bowel or transversely. There is some difference of opinion among operators who have done many of these operations for gunshot wounds as to whether it is better to close a wound in the intestine in the long axis of the bowel or to close it transversely. Most of the recognized text-books on the practice of surgery say that these wounds should be sutured transversely, the object being that the lumen of the intestine is less encroached upon than where we suture in the long axis of the bowel. It has been my practice in all operations that I have performed to follow the teachings given us in text-books, to suture the wounds in the long axis of the bowel, and I have sutured as many as fourteen wounds in the small intestine made by one missile. It has been suggested by one of the members of the Association that the reason why I did not get as high a percentage of good results in the twenty operations I have performed for gunshot wounds of the abdomen was because I sutured these wounds in the long axis of the bowel. I have taken exception to that criticism, for the reason that post-mortem examinations were made in all of the cases upon which I operated that terminated fatally. In those cases in which I found it necessary

to resect the intestine (and there were several), in which I made use of Murphy's button, at the post-mortem examination, forty-eight hours after operating, I found complete healing had taken place between the approximated surfaces of the peritoneum, and when water was passed into the intestines there was no escape. It is manifest, then, that the low percentage of success in the twenty operations done by me for penetrating gunshot wounds of the abdomen was not due to contraction or constriction of the intestines at the point of introduction of the sutures for the closure of these orifices, but that in every case failure was due to septic peritonitis.

Unfortunately, most of the cases upon which I operated came to me many hours after the wounds were inflicted. These cases occurred mostly in colored people, brought to me from the phosphate mines, not having the advantage of immediate surgical assistance. The wounds were not protected from infection, and most of the wounds were more or less infected before I saw the patient. Very few of my operations were performed in less than twelve hours after the shooting. Those cases upon which I operated within twelve hours after the accident recovered.

I agree with Dr. McRae with reference to the exposure of the viscera. My rule has been to expose only that portion of the intestine which I am examining at the time, following it up, and replacing it as fast as possible, covering the intestines with pads soaked in sterile normal salt solution.

Dr. F. W. Parham, of New Orleans, La.—I would call attention to two points. First, the advantage of doing an operation short of resection of the bowel in some cases where the wound is too large to be sutured without some special provision against too great abridgment of the lumen. I refer to the advantage of a procedure which is the same as that of Heinecke-Mikulicz, proposed for stenosis of the pylorus. I have carried it out with great satisfaction in one case of herniotomy. The bowel was constricted by exudate in its wall to such an extent that I feared there would be permanent obstruction. The operation is simple, and is elaborated by Abbe in the supplement to Wood's *Handbook.* You make a longitudinal incision through each end of the tear, pull it open transversely, and suture; the two longitudinal ends of the incision come together, and the lumen is thus very materially enlarged. There is no chance of obstruction.

We can save time by such a procedure in preference to doing a complete resection.

I would call the attention of the Association, in the second place, to the use of formalin in the abdominal cavity as a protection against sepsis. My friend, Dr. Fenner, has had some experience in that respect.

In a case where formalin solution was used in the abdominal cavity, in which there was rupture of the appendix during operation into the peritoneal cavity, the cavity was washed out with formalin solution, and the wound sutured without any ultimate septic result.

Dr. E. D. Fenner, of New Orleans, La.—In reference to the use of formalin, our attention at the hospital was first directed to its use in the abdominal cavity by the report of a Canadian abdominal surgeon, who wrote an article in which he detailed a series of careful and extensive experiments, by means of which he had established to his own satisfaction the fact that formalin did no harm to the peritoneum; that it could be left in large quantities without producing any ill effects whatever, and it seemed to exert a decided and powerful protective influence over the patient.

The President.—What is the strength of the solution?

Dr. Fenner.—About 1:1000. We have used a somewhat weaker solution than this in some cases. We had occasion in operating on a case of appendicitis in which there were considerable adhesions and an abscess deeply located in the neighborhood of the appendix to try the solution, because in getting at the appendix the abscess ruptured and pus escaped into the general peritoneal cavity. We felt we had to deal with a condition where peritonitis was certainly imminent. Acting on the suggestion of this surgeon, whose name I cannot recall, we flushed the cavity thoroughly with formalin solution, with the result, so far as the patient was concerned, that he recovered without any interruption, and no symptoms of peritonitis developed. After thorough flushing we filled the cavity with the solution, and sutured the wound with the fluid still in the cavity. Whether the result was attributable to the formalin solution or whether flushing with normal salt solution would have had the same effect I am not able to say. We are inclined to attribute some of the benefit to the use of the formalin solution.

Other cases have been mainly instances of abdominal section for gunshot wounds, of which I have had a large number, and I cannot say that formalin has had any special effect in those cases.

In regard to the question brought up with reference to the exposure of the intestines in these operations, I believe everybody who has done much of this work will agree with me, that where it is possible the intestine should be kept in the belly. In a man who has received an abdominal wound with a large sized bullet there may be numerous perforations of the bowel and of the mesentery, and when you open the abdominal cavity you find it full of blood, and you can see at different portions of the bowel the points where vessels are bleeding profusely. I do not believe it is safe to mark the starting-point of your inspection and then go along over the length of the bowel, suturing the wounds as you proceed. These patients in the meantime are bleeding. Your first duty is to stop the flow of blood if you can. Whenever practicable, we eviscerate the small intestines to secure the bleeding vessels and to protect them as far as possible, replacing them where we can, and go on with the suturing. The suturing of numerous intestinal wounds is a thing that takes considerable time, and I do not believe that the patient should be left with the vessels bleeding while we close the perforations one by one. It is better, if possible, to arrest hemorrhage first, then proceed with the closure of the perforations.

The line of suturing these wounds is one that must be dictated by the common-sense of the surgeon and the nature of the intestinal wound. Some wounds are of such a character that common-sense indicates that the suturing should be done in the long axis of the bowel. In the majority of cases I believe the suturing can be done transversely.

Another detail in regard to these cases is that very frequently the intestinal wound is quite large, and not only does blood flow into the cavity, but you can see the vesico-fecal contents oozing out of the wounds into the peritoneal cavity. I believe that this is one of the chief sources of danger in this operation, soiling the peritoneal cavity by extravasation of fecal contents. Therefore, in many cases evisceration and protection of the wounds with pieces of gauze is a step which is more important than the mere protection of the intestines from contact with air. Of course, you can use hot towels and other measures to protect the bowel.

In connection with the report of Dr. Crofford's successful case, I am able to report a case of my own of successful operation for pistol shot wound of the abdomen, the bullet entering in the neighborhood of the umbilicus. On opening the abdominal cavity some hours after the receipt of the injury we found seven wounds of the bowel, and two large rents in the mesentery, which were sutured. We employed fine silk and Lembert sutures. The patient made an uninterrupted recovery. I saw the patient a number of months after the operation; there is no sign of hernia at the site of the wound, and the patient appears to be in good health.

Dr. J. G. Earnest, of Atlanta, Ga.—There are other sources of peritonitis outside of those generally recognized. I recall a case which I think is sufficiently unique to be worthy of reporting to this Association. A woman was supposed to have been in most excellent health, was doing her housework, and gave a history of having a slight diarrhœa and irregularity of the pulse two or three months previous to the time I saw her. She was taken with profound shock. I was called in, and found she had a subnormal temperature at the time. The pulse was almost obliterated. She remained in this condition for a great many hours. On the following day she rallied somewhat. Her condition seemed to indicate a hemorrhage, and I examined her to see if the case might not be one of ruptured tubal pregnancy or hæmatocele from any cause. I determined to wait until the next day. On the following day I found a slight rise in temperature, and determined to open the abdomen to see what the trouble was. I found about a foot and a half above the lower end of the small intestine a ragged opening, covering one-half of the diameter of the bowel itself. Below this point were three other points in which the muscular coat had been destroyed, and there was no other covering except the peritoneum. There was nothing to do in this case other than to resect the bowel, which I did, and on the following day she was considerably better, but died ten days later from peritonitis. It is a question in my mind what produced the ulceration of the bowel. She was a woman of intelligence, and her people were intelligent, and she stated positively that she had had no fever up to that time, and was well, excepting she had a slight diarrhœa, which was not regarded of much consequence up to the time shock came on.

Dr. William E. Parker, of New Orleans, La.—I should not take part in this discussion were it not for the fact that Dr. Simons has alluded to a conversation which we had, and in which I said that I believed better results could be had by suturing in the long axis of the bowel than transversely. When I said that I did not mean to lay it down as a hard-and-fast rule; but where it is a matter of choice I believe there is less danger of obstruction, and that these cases would require fewer resections, if sutured in this way, than if sewed transversely.

I believe the high percentage of mortality which the doctor had in his cases was largely due to two causes: one, that the patients came under his care in ten or twelve hours after the receipt of the injury—some of them longer; the other, to suturing the bowel in the manner he referred to. I believe the mortality in these cases varies with the length of time we get into the belly. The doctrine we should preach is to get in and get out of the belly as quickly as we can consistent with good work.

Dr. Crofford (closing the discussion).—As to the criticism of Dr. McRae, which was very properly made, in regard to eviscerating, if I had read the paper in full he would not have gotten that idea. The case was not eviscerated; but the intestine was gone over by taking out quite a long loop at a time. If we found perforations in it, it was wrapped in sterilized gauze, sutured, and made clean before it was put back into the cavity. If we keep the intestines in the abdominal cavity altogether we cannot stop hemorrhage, and you cannot make the intestines as clean as if you take them out and pour a pitcher of water on them.

As to the method of suturing the bowel in its long axis or transversely, I do not think it makes much difference. We get as much tension by suturing one way as the other. I do not pay much attention to that; I usually suture across the rent of the bowel. However, if I had an opening sufficiently large to diminish the lumen of the gut very much, I should prefer to stitch it transversely.

As to the first question asked by Dr. Simons, the patient was shot about seven o'clock in the morning, and I saw her not more than an hour later. I operated at eleven, which was four hours from the time of the receipt of the injury. The firm stand I took that morning saved the life of the patient. They

had called in a physician who had given a small dose of morphine hypodermatically, and told the husband that the proper thing to do was to make her quiet, and then determine whether there was any perforation or not later on. I impressed upon the husband the importance of operating as soon as possible. He took my advice, and an early operation saved her life.

SEVENTEEN YEARS OF CONGENITAL NOCTURNAL INCONTINENCE OF URINE CURED BY OPERATION.

By George H. Noble, M.D.,
Atlanta, Ga.

The rarity and intractability of congenital incontinence of urine of long standing make this case interesting. The subject of this report is an overgrown girl, seventeen years of age, who continued the habit of wetting the bed all her life.

In the daytime she had sufficient control over the bladder to enable her to reach a fit or proper place for urination.

Careful examination failed to disclose any physical defect of the urinary apparatus. The urine was normal in every respect, neither were there rectal irritation nor constipation to which a reflex could be ascribed.

She was not a person of neurotic temperament, being phlegmatic and sluggish. As medical treatment had utterly failed, she entered my infirmary September 26, 1898, where a cystoscopic examination was made with the electric light, while the patient was under the influence of chloroform, without finding even as much as a simple hyperæmia of the mucous membrane of the trigonum. An injection of sterile milk was used in search for a congenital fissure or fistula, but in vain.

A close inspection failed to disclose a supernumerary ureter, or one with an opening abnormally placed.

Failing to find any malformations, it seemed probable that it was due to a local condition acting as an exciting cause. My attention was therefore directed to an inflamed and thickened hymen, which was annular in shape and infiltrated until

No. 2.

No. 1.

No. 3.

it was three-eighths of an inch thick at its base or outer margin, and, having very intimate connection with the meatus, it occurred to me that it was the source of the trouble.

It was her habit to sleep on her face, which doubtless contributed to an accumulation of bodily heat about the external genitalia, resulting in stimulation of the sensitive and irritable hymen, which, becoming more or less erectile, irritated the meatus; this in turn stimulated the circular muscles at the neck of the bladder and trigonum, resulting in involuntary micturition.

Acting upon this idea, September 28, 1898, I cut through the hymen on either side of the meatus, and dissected the urethra free from its attachments for half its length. (See dotted line, Fig. 1.)

At this stage of the operation the urethra was hanging from the pubic arch like a pendant (see Fig. 2) with a portion of the hymen attached to the under surface, and each side of it close to the meatus.

Separation of the urethra from its attachments severed all nerve connection with the meatus, cutting off all possible reflexes from the inflamed hymen. The next step in the operation consisted in passing two sutures through the attached portion of the hymen, on either side, and fastening them to the pubic arch, making a sling or support to the urethra. (See Fig. 3.)

This being in the nature of an experiment, I made use of a little moral treatment. It consisted in having her awakened the first night every two hours to void the urine; the second night, every three hours; the third night, every four hours, and so on until she passed the entire night without evacuating the bladder. She was impressed with the belief that the operation must necessarily relieve her, consequently no chances of involuntary urination could be taken. The progress of the case was exceedingly gratifying, no accidental passage of urine or unpleasantness whatever occurred. At no time since the operation has she experienced any discomfort from her former trouble, but has remained perfectly well.

SUSPENSION OF THE UTERUS BY INTRA-MURAL SHORTENING OF THE ROUND LIGAMENTS.

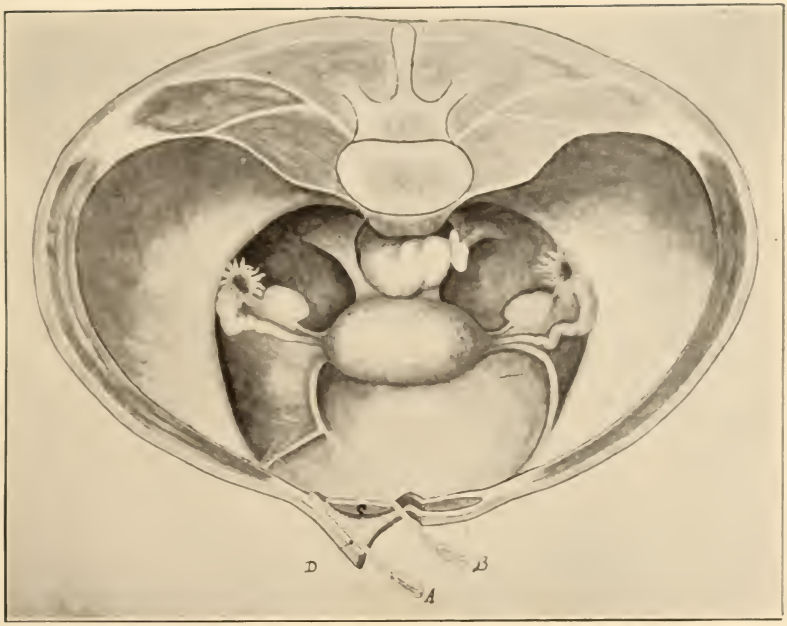
By George H. Noble, M.D.,
Atlanta, Ga.

The uniform attainment of satisfactory results in reposition and fixation of downward and backward displacements of the uterus fail for reasons that the anatomical supports utilized are either too weak or are imperfectly fixed. In ventro-suspension, the pedicle often acts as an irritant on account of the buried suture in the fundus, encouraging hyperæmia of the uterus, and frequently interferes seriously with the development of the uterus in the process of gestation, or stretches away from the abdominal parietes and becomes useless.

With the hope of overcoming these, and minor disturbances, the writer began the study of the question some years ago, and, after devising the methods here presented, delayed in operating, endeavoring to thoroughly consider both sides of the question, less some objectionable feature might defeat the object to be attained. Finding no serious obstacle, it was put to the first test April 6, 1893, in the Grady Hospital.

The operation was carried out in detail as it had been planned, and, much to the gratification of the writer, has proven perfectly successful, lasting uninjured for the past six and a half years, under the strain usual to advanced procidentia uteri. Desiring to await secondary or deferred results, rather than to proceed unguardedly with a multiplicity of cases, ample time was allowed before doing the second case,

Fig. 1.



A. Forceps in peritoneal cavity grasping round ligament and drawing the same in the direction of the centre of the pelvic cavity, to render tense the distal end and to drag the peritoneum away from the internal abdominal ring.

B. Forceps passed along the finger in the subperitoneal fatty tissue to the round ligament, for the purpose of drawing a loop of the same between the rectus muscle (c) and the transversalis fascia (d).

which was operated upon December 8, 1895. The others occurred in the following order: July 9, 1896; March 21, 1897; January, 1898. The records of the hospital show the details of these cases. In addition to the foregoing I have operated seven times in my private infirmary (see below).

All cases up to date have proven perfectly satisfactory excepting an infected suture in one case, which suppurated and required removal. The infection, caused by accidental slipping of the dressing, extended to the buried suture on the left side, but did not prevent satisfactory suspension of the uterus.

The operation is an intramural and extraperitoneal implantation of the round ligaments.

1. The first step consists in making the usual abdominal incision in the median line, for the purpose of exploring the pelvic cavity, breaking up adhesions, removing diseased appendages, etc.

2. After thorough inspection, the round ligament on the side most convenient is seized with a pair of light compression forceps, with teeth in end (Senn's), and drawn toward the centre of the pelvic cavity, with a view of rendering the distal end of the ligament taut, to facilitate manipulations outside the peritoneum. A pair of artery forceps is then passed through the posterior sheath of the rectus muscle at its outer border, and at a point an inch to an inch and a half above a line drawn from one internal abdominal ring to the other. The forceps are spread open and withdrawn, thus making an aperture sufficiently large to admit the finger easily. Through this opening the finger is passed behind, extraperitoneal, the peritoneum to the tightly drawn, cord-like ligament, which is in the direction of the internal opening of the inguinal canal. By a succession of downward movements the peritoneum is stripped from it for an inch or two.

3. The forceps are here given to an assistant to hold while the operator passes a similar pair above the finger in the subperitoneal fatty tissue and grasps the round ligament as near

the peritoneum as possible, and draws it out as far as its attachments will permit.

4. The stripping is again resumed, and when sufficient another pair of forceps is introduced below the second, and an additional section of the ligament drawn up, the other forceps being removed. The stripping continues from the support given by the forceps in the hand of the operator until the ligament is drawn well out of the wound, between the rectus muscle and transversalis fascia, to the edge of the incision. The process is then repeated upon the other side.

5. Both ligaments are clamped together in the median line, which places the uterus near or about the position where it is to be fixed. They are carefully freed from fat or foreign tissue, in order to permit direct contact and adhesion to the recti muscles and transversalis fascia.

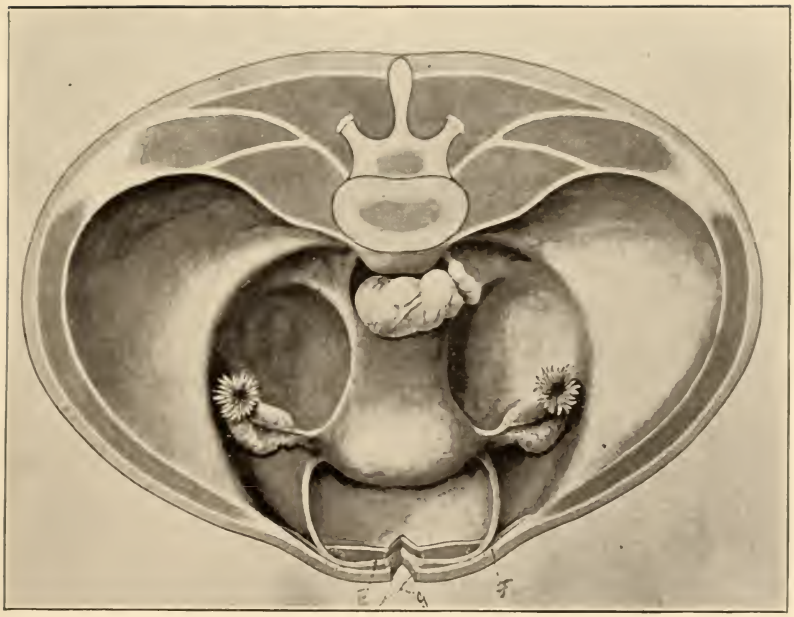
6. Then on each side where the ligament appears through the opening made in the posterior sheath of the rectus muscle —*i. e.*, the outer border—a silver or silk suture threaded upon a stout curved needle is passed through the transversalis fascia from within outward, and on returning takes about half an inch of the fascia in the stitch. It is then carried through the round ligament,[1] rectus muscle and posterior sheath, and returned through sheath, muscle, and ligament, taking in about three-fourths of an inch in this stitch. The sutures are tied carefully but not tightly, cut, or, if wire is used, twisted, and the ends folded under twice, to prevent sticking by the sharp points.

7. The ligaments are released at the median line, where another suture is passed, taking fascia, ligament, muscle, and sheath on one side, and in a reverse order on the opposite side, and twisted or tied upon the external surface of the fascia. It is better not to fasten this stitch until the abdominal sutures are in.

8. Close with silkworm-gut, and apply aseptic dressings, the edges of which should be glued to the abdomen with

[1] Care must be observed in passing the needle through the round ligament not to injure the artery or vein.

Fig. 2



E. The loop of round ligament drawn between the rectus muscle and the transversalis fascia, and anchored to same by buried suture (f).

G. Buried suture uniting the extremities of the loop in the median line.

flexible collodion. No pessary will be required unless the uterus is unusually heavy.

The ligaments have been drawn between the rectus muscle and fascia, for the purpose of contracting extensive adhesion to the unyielding structures, which becomes sufficiently strong to support the uterus after disintegration or absorption of the suture takes place, and to secure direct suturing to the transversalis fascia, a tissue possessing strength and elasticity, elements that are necessary to ideal implantation or anchorizing of a support upon which more or less constant weight and frequent impulse of intra-abdominal pressure are exerted. Supports receiving their attachments from fixed points, such as bony structure or fascia in close proximity to the same, receive the brunt of the force more or less suddenly, and in consequence participate in the strain, with a degree of injury, each time the force is applied. Per contra, supports receiving attachment from a firm, elastic structure, such as the transversalis fascia, at a point distant from its bony attachment, do not feel the sudden impulse of the force above mentioned, but receive it gradually as it is expanded upon the elastic parietes of the abdomen.

The danger of the operation is about on a par with an exploratory incision, so far as the abdominal cavity is concerned. The separation of the peritoneum is not a serious question. Large areas of it may be stripped off with impunity, especially when there are three sides of the field attached, as in this case. It will not pouch, for the intra-abdominal pressure keeps it in close relation to the parietes.

There is no danger of injuring the epigastric vessels, as the tension made upon the ligament draws it and the peritoneum sufficiently far away from the internal abdominal ring to render the manipulation safe.

This operation possesses many advantages over others designed for the same purpose. There is but one incision; through it the pelvic complications are accessible.

The point of attachment is nearer the uterus, where the round ligament is larger and stronger, and therefore it does

not depend upon the weak or distal end of the ligament for support, as the operations of Wilie, Emil Bordé, Mann and others do.

It is applicable to a greater range of cases.

It does not interfere with physiological mobility of the uterus or its development in pregnancy.

No bladder irritation or dysuria is caused by it.

There are no sutures in the fundus to irritate the uterus.

To all peritoneal attachments it is superior in permanency. It cannot stretch away or pull off, as the ligament is fixed to the transversalis fascia by a buried suture.

It is an extraperitoneal fixation, and leaves no points of irritation to contract adhesions to the abdominal viscera.

It does not prolapse or antevert the uterus as Emmet claims the Alexander operation does, but suspends it in a more perpendicular position—that is, in the axis of the brim of the pelvis.

It is free from the liability of hernia so common after the Alexander operation, as the round ligaments do not pull open the internal abdominal ring by constant strain upon its inner border.

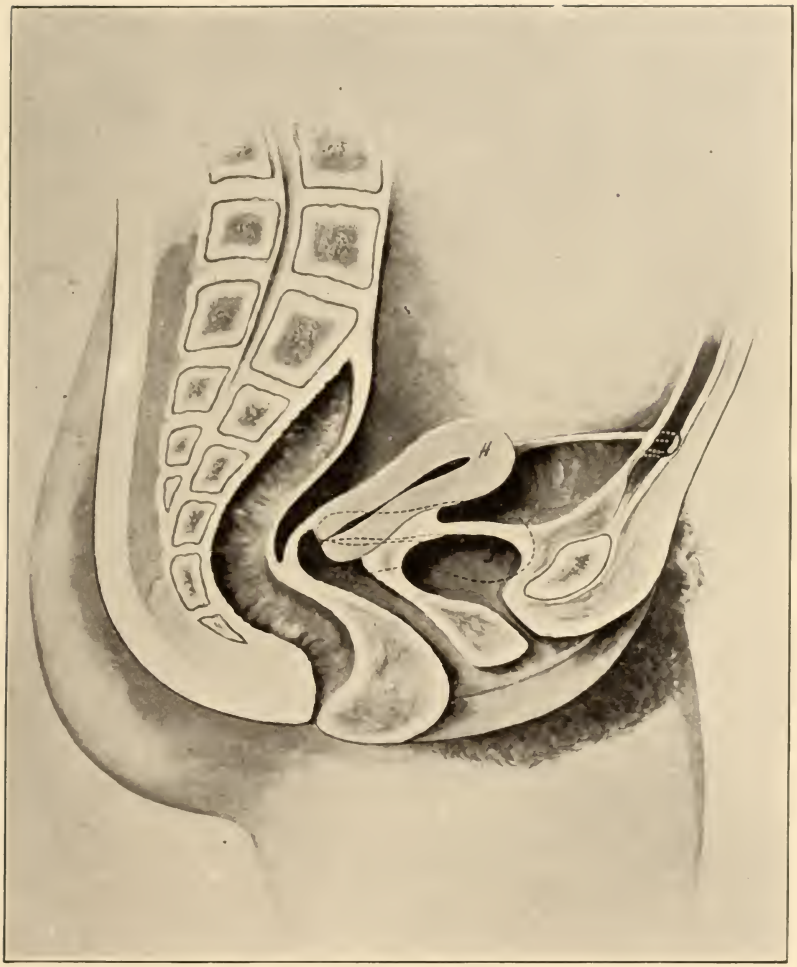
Mrs. A. M. M., aged forty-six years. Small, anæmic, poorly nourished woman, six children, menstruation free, regular, aching, etc. Suffering from complete procidentia uteri, entire uterus lying outside of the vulva. Perineum lacerated to the sphincter ani muscle. Vaginal orifice very much dilated. Muscles of perineum relaxed and atrophied from disuse.

Abdomen opened April 6, 1893. No adhesions, appendages healthy, but displaced, etc. Round ligaments drawn up and implanted between recti muscles and transversalis fascia with No. 24 silver wire (as described).

The result was very favorable, scarcely any elevation in temperature or pulse curves. No harm came from the rather free separation of peritoneum from abdomen, which was more extensive than what occurred in subsequent cases.

Abdominal suture removed at the end of the seventh day ;

Fig. 3.



H. Vertical section in median line showing the position of uterus when implantation of the round ligaments is done.

I. Dotted lines show the relative position of the uterus in Alexander's operation according to Emmet.

out of bed on the fifteenth day. The uterus remains in an elevated position (*i. e.*, in the axis of the brim of the pelvis), freely movable, and creates no discomfort. Six weeks subsequently colpoperineorrhaphy was done for the gaping vagina.

This woman has had hard domestic duties that have put the case to a severe test without any unfavorable signs resulting.

N. J., yellow woman, aged thirty-five years. No children. Has had chronic subinvolution and mucopurulent discharge following miscarriage and an attack of pelvic peritonitis. Had been wearing a pessary for five years.

Operation, July 9, 1896. Many adhesions of appendages and uterus to intestines and omentum, but delicate and easily ruptured. Round ligaments implanted between the recti muscles and transversalis fascia by silver wire suture.

Result satisfactory. Uterus swings freely, at a high elevation. No subsequent dysuria or discomfort.

This woman has been cooking constantly without bad effect.

Mrs. E. C. W., white, aged thirty-five years. Anæmic, neurasthenic, menstruating regularly, but scantily. Had been confined to bed a great part of the time since last childbirth, two years since. Had retroversion, with subinvolution. Uterus increased in size fully 100 per cent. Suffered bearing-down pains, dragging sensations, dysuria, and an occasional attack of cystitis.

Operation done December 8, 1895. The round ligaments were drawn between the recti muscles and fascia, and fixed with wire sutures.

There was scarcely any elevation of temperature or change in pulse. Results satisfactory. The uterus remains elevated and swings freely. The round ligaments were not attached as high up the abdomen as recommended, or as in the other cases, so the fundus uteri is lower, or nearer the bladder, though not near enough to cause pain or discomfort.

This case was out of bed on December 24th.

Mrs. F. C. S.,[1] white, aged thirty-six years. Tall, large-framed woman, anæmic, syphilitic (tertiary). Has been an invalid from subinvolution and extreme backward displacement of the uterus. Mucopurulent discharge, cyst of the left ovary.

This woman has been under my observation for two years. Has been relieved very greatly of the anæmia; treatment for the local or pelvic diseases afforded much relief; also under constant treatment for syphilis.

Operation done March 21, 1897. Cyst of left ovary, size of an egg, removed; numerous adhesions broken up. Round ligaments implanted between recti muscles and fascia, with silver wire.

Recovery slow, but good. No unfavorable symptoms. The uterus remains high and freely movable. No bladder symptoms.

L. T., of Florence Crittenden Home, aged twenty-four years. Gave history of normal confinement two years ago. Cervix uteri lacerated on one side. Uterus subinvoluted, retroverted, and lying low in pelvis. Frequent attacks of hysteria, disposed to complain of trivial matters. Frequent dysuria, pain at times said to be severe.

Operation done January 20, 1898. Adhesions universal, but not very dense—separated on slight pressure. Round ligaments drawn between the recti muscles and fascia at a point a little higher than any other case, drawing uterus up more than necessary, so that for a time she complained of pulling sensations at the points where the ligaments were attached.

The case made a good recovery, excepting that the lower end of the dressing became loosened, the wound uncovered, and infection of the two lower stitches occurred on the fifth day, resulting in cellular abscess, the size of an egg, on the left side. It was promptly drained and healed without delay.

[1] Both this and the preceding patient have since been confined, giving birth without any unpleasant symptoms. The uterus in each case resumed its normal position after labor.

November 8, 1898. Mrs. H., double salpingitis, cyst of each ovary, extensive pelvic adhsions, uterus bound down in pelvis by very dense adhesions. Appendage on both sides removed, uterus suspended by intramural shortening of round ligaments. Silk suture. Cured.

January 17, 1899. Miss B., hystero-mania, uterus retroverted, hyperæsthetic, could not bear pessary, uterus engorged and covered by numerous bands of delicate adhesions, very anæmic. Suspended by intramural shortening of round ligaments. Silk suture. Success. Mania and hyperæsthesia also relieved.

February 11*th*. Mrs. S., old pyosalpingitis, double; pelvic organs deeply embedded in dense adhesions, slight tear in perineum; hystero-epilepsy, very anæmic and neurasthenic, double salpingo-oöphorectomy. Silk suture. Cured.

March 19*th*. Mrs. H., cyst of left ovary, size of an egg, subinvolution, retroversion, extensive adhesions, mitral stenosis; very anæmic. Cyst removed, uterus suspended by intramural shortening of round ligaments. Result: relief of displacement and a great deal of pelvic discomfort, but has not entirely recovered from anæmia and neurasthenia. Silk suture.

April 12*th*. Mrs. I., retroversion and prolapsus to vaginal outlet, anæmia, hysteria marked, partial loss of perineum. Intramural shortening of round ligaments. Displacement corrected. Anæmia and nervous symptoms much improved at time of dismissal. Silk suture.

June 3*d*. Mrs. S., subinvolution, retroversion, fibroid tumor size of walnut on fundus uteri, extensive adhesions, anæmic and neurasthenic, lacerated perineum. Suspension of uterus by intramural shortening of round ligaments, removal of fibroid tumor by excision. Perineorrhaphy. Silk suture. Cured.

6*th*. Mrs. A., anæmia, lacerated perineum, both kidneys at crest of ilium, uterus retroverted and firmly fixed in concavity of sacrum. Intramural shortening of round ligaments. Perineorrhaphy. Relieved except some slight discomfort from dragging kidneys. Silk suture.

Since writing the above I have operated on five additional cases in my private infirmary, as follows:

Mrs. H. G., aged twenty-five years, of Atlanta, had suffered for several years with repeated attacks of pelvic peritonitis. She had recently been curetted by another surgeon, but received no benefit from it. Uterus was large, engorged, and very sensitive to the touch, and fixed in retroverted position.

On September 17, 1899, the abdomen was opened, and extensive adhesions over the uterus and appendages were broken up. The ends of the Fallopian tubes were occluded, necessitating splitting and formation of triangular flaps, which were turned back and stitched to the sides of the tubes with catgut, everting the tubal mucosa, with the hope of permanently securing a patulous extremity.

An incision about half an inch in length was made upon the upper border of the Fallopian tube, beginning at a point about half an inch from its outer extremity, and running directly to the upper border of the obstructed end, thence turning at right angles it was extended directly downward, across the clubbed-shape extremity, to the floor of the tube, thus forming the triangle A B C on the anterior and posterior surfaces.

The apices of the two angles at B were turned outward from the centre of the tube, then backward, toward the median line of the body, fixing the apex of each angle with a catgut ligature.

The object of everting the mucous membrane is to prevent closure of the ampulla by contraction or adhesion of the cut edges.

The imprisoned ovaries were released, and the uterus elevated and anchored in its normal position as above. Recovery was smooth and satisfactory.

Miss H. S., aged thirty years, always suffered from dysmenorrhœa, and for the last six years has had retroversion with increased pain at menstruation; hysteria, nausea, and frequent distressing bearing down sensations in the lower part of the abdomen.

FIG. 4.

FIG. 4'.

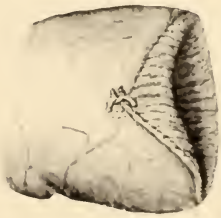


Fig. 4. Showing lines for formation of triangular flaps.
Fig. 4'. End of Fallopian tube after eversion of triangular flaps.

The mucous membrane was hyperæsthetic, and constantly covered with mucopurulent and acrid discharge, for which she was dilated and curetted.

On July 26, 1899, the abdomen was opened and the uterus was successfully suspended as in the above operation.

Miss F. R., aged twenty-three years, of Atlanta; menstruation was always painful; menorrhagia, hyperæsthetic endometrium, uterus retroverted and fixed in pelvis. Gave history of an attack of pelvic peritonitis four years ago. Pelvic organs excessively sensitive to pressure. Had local treatment for some time without much relief, on account of inability to replace uterus. On September 23, 1899, the uterus was dilated and curetted, removing a fair amount of hypertrophied mucous membrane. The abdomen was opened, adhesions broken up, and uterus suspended as above. Result perfectly satisfactory.

Miss N. S., aged twenty-three years, of South Carolina; neurasthenic, anæmic, hysterical for six years. Claims to have displaced the uterus by violence, to which she attributes her ill-health.

I first saw her three years ago, and dilated and curetted the uterus for dysmenorrhœa and menorrhagia; removed a large quantity of hypertrophied mucous membrane. Uterus was subsequently replaced and supported on a pessary. She had a chronic catarrhal proctitis. Claimed that the instrument gave her great discomfort and nervousness. After returning home she removed the pessary with no relief of rectal pain. Uterus became displaced, much engorged, and her old nervousness, hysteria, etc., returned.

She had an external hemorrhoid which was supposed to be responsible for some of the rectal distress. It was removed, but gave but little relief.

Afterward she entered my infirmary, where, on November 14, 1899, the abdomen was opened and the uterus suspended as above.

Later, the inflammation of the sigmoid and rectum was treated by local applications through the long proctoscope,

with much relief. In a recent communication from this patient she expresses herself as entirely cured.

Mrs. W. H. E. T., of Florida; had been suffering from repeated attacks of pelvic peritonitis with fixation of uterus and appendages in a prolapsed and retroverted position.

Upon admission to infirmary she was found to be convalescing from chicken-pox.

On November 7, 1899, the abdomen was opened, numerous dense adhesions over the uterus and appendages were broken up. Appendages were removed on account of double pyosalpingitis and cysts of each ovary. The uterus was successfully suspended, and in two weeks had reduced 50 per cent. in size.

AN OPERATION FOR CYSTOCELE.

By George H. Noble, M.D.,
Atlanta, Ga.

The necessity of operating for cystocele, either with or without plastic operations of the female genital tract, is not an infrequent occurrence. The unsatisfactory results of operations usually employed, especially in old women with relaxed and dilated vaginal outlets, are frequent. Usually failure is due to stretching of the newly formed cicatrix, or to imperfect attachment when the base of the bladder is anchored to structures above the plane of the anterior vaginal wall.

In the absence of dense fascia in this part of the genital canal the repair of cystocele must depend upon the fixation of soft yielding structures to similar parts, but should be reinforced by ample support from the posterior vaginal wall and perineum, and in certain cases with ventrosuspension or some similar operation. Even then the results are not invariably good. This, with the fact that extensive operations in old women are objectionable, makes an urgent appeal for improvement in technique.

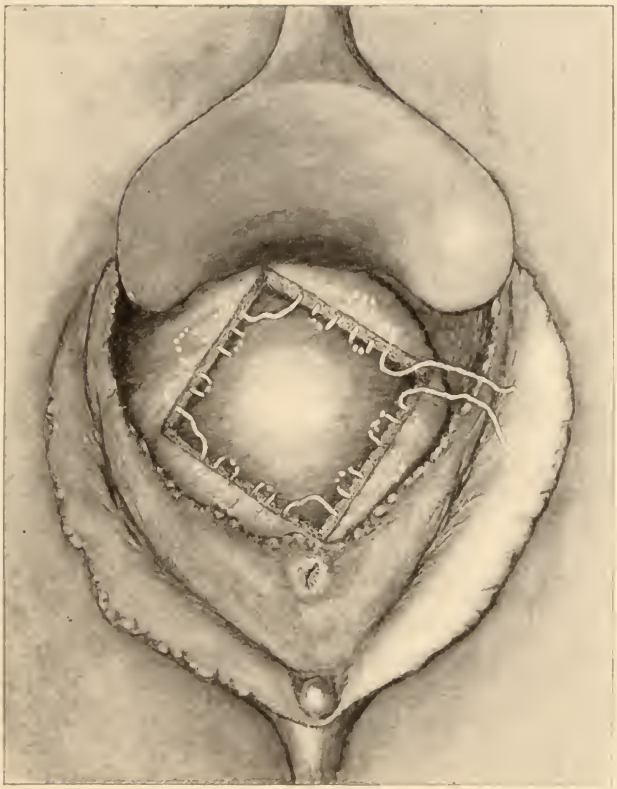
Hoping to find something to answer the demand, various procedures were tried as cases of this kind presented themselves to me. First, superimposed layers of catgut sutures were used in the sulci on either side of the vagina with fair success, and perhaps superior to the ordinary Stoltz-Sims operation, or elliptical denudation.

Following this the redundancy of tissue was folded in upon itself and pressed into the bladder-space by superimposed

layers of catgut sutures in the median line (see Case I.). The effect was quite good, but occasionally there would be some return of the cystocele in after years. Other modifications were tried with varying success until buried sutures of silk, silver, and kangaroo were used.

With patient in the Sims' position a diamond-shape denudation is made over the protruding cystocele, which should be outlined in the following manner: With two pairs of tenacula the mucosa is picked up on either side of the vagina, about half-way up the canal, and drawn toward the median line. This is repeated until two points are selected that will barely meet or touch when slight tension is put on them. They are marked by snipping out the pieces of mucous membrane engaged by the hook. In like manner the angle at the base of the urethra, and also one anterior to the cervix uteri, are marked. A tenaculum should engage the point on the right-hand side and sufficient tension made upward to throw the mucous membrane of the vagina into a sharp fold or ridge running from the urethra to the tenaculum. With a pair of scissors a strip of mucous membrane is pared off along the crest of the ridge marking the right inferior side of the quadrangle. The hook should then be fixed at the mark anterior to the cervix and a thumb forceps should catch the lateral angle just released from the tenaculum. The two intruments are then drawn in opposite directions, forming a fold in the vaginal wall similar to that described above. A strip of mucous membrane is removed between the instruments marking the right superior side of the quadrangle. In like manner outlining of the diamond is completed upon the opposite side, after which it becomes an easy matter to remove the island of mucous membrane in one piece. All fatty tissue should be removed as far as practicable, that it may not interfere with direct contact of the muscular tissue. The sutures are easiest introduced by starting on one side of the urethral angle. The needle should enter the edge of the denuded surface beneath the mucous membrane, penetrating at the junction of the middle and lower third of the right

Fig. 1.



anterior side of the quadrangle, passing in an eccentrical direction, to a depth of half an inch, into the vesicovaginal septum. On returning it should emerge from the margin of the wound half an inch away, completely burying the suture. It is then carried a short distance toward the centre of the field, perhaps half an inch, and a deep stitch taken in the vaginal wall, but not including the mucosa of the bladder. The suture is then returned to the margin of the wound and another buried stitch made as first described, but penetrating the septum one-fourth to one-half inch further. Another stitch is then made in the denuded surface, after which a third one is introduced upon the outer side of the wound as first described (see Fig. 1). In this way five stitches are introduced on each side of the diamond (see Fig. 1), three of which are submucous and extended horizontally outward, including the muscularis of the vagina and bladder; the other two are made in the denuded field and passed at right angles to the surface. It will be observed that a line drawn from the tips of each of the loops extending outward will approximate a circle, and the suture when drawn tight will assume a similar shape, effectually closing the wound on the principle of a purse string. The sides of the diamond are forced sharply inward and each converted into a right-angled triangle, the apices of which come in close contact in the centre of the wound, forming an imperfect cross (Fig. 2). The margins of the wound are accurately closed with catgut, (see Cases IV. and V.).

When silk or kangaroo sutures are used they should be introduced in a slightly modified manner (Fig. 3). Let the diamond *a*, *b*, *c*, and *d* represent the denuded surface over the vesicocele. Four small silk sutures are passed across the angles at the points 3-3-3-3, or at a distance from the angles equal to one-fourth of the respective sides of the quadrangle. They should be small silk or medium kangaroo, and include all the tissues of the vesicovaginal septum except the mucous membrane on either side, and should be buried deep. They

serve to close the angles of the wound and reduce the field of operation to such an extent that a smaller purse-string suture can be used. This is quite an important feature for unabsorbable sutures. When they exceed No. 28 silver wire in size the latter gives the least resistance, consequently the shorter the ligature the better are the chances of success, especially when silk is used.

This suture should be introduced in the manner described in Fig. 1, except that one stitch or loop only is made on each side of the diamond.

It should follow the line 2-2-2-2, each stitch surrounding the central point (Fig. 3, 1) of each side of the quadrangle. In passing across the denuded surface, from side to side, two deep stitches should be taken in the base of the bladder down to but not including its mucosa, at the points marked X. When drawn together and tied the sides of the diamond are forced in concentrically (Fig. 4, 1), producing the same effect as the wire—that is, the formation of a cross. The margins of the wound should then be closed with a whip-stitch of fine catgut (see Cases II. and III.).

Success of the operation does not depend upon the use of silver wire, *but any lasting buried suture may be used.* Any one familiar with the technique of burying fine silver wire (No. 28) will meet with success when employing it in this operation. It should be buried deep, fastened with very little tension, and the ends folded under twice and mashed down flat to prevent sticking or irritation (Figs. 5 and 6). When wire is used it is perhaps better to begin its introduction at one of the lateral triangles, that the twisted ends may be covered more deeply and placed out of harm's reach. Silk suture, large kangaroo, chromicized catgut are satisfactory materials, but personally I prefer the silver *for very bad cases,* because I have had no unpleasant result with it in the operation.

Case I.—M. C., Atlanta, Ga., aged thirty-five years. Admitted to King's Daughters' Hospital, April 30, 1890.

Fig. 2.

Physical examination : Anæmia, neurasthenia ; heart, lungs, and kidneys negative. Perineum lacerated to sphincter in last confinement, four years ago. Uterus subinvoluted, retroverted, and about three times normal size. Bladder rolling out between vulva in a mass the size of a large goose-egg ; frequent dysuria, urine alkaline, otherwise negative.

An oval denudation was made over the cystocele to its base on all sides, and superimposed layers of catgut sutures (whip-stitch) were put in from above downward, tucking the redundancy of tissue into the bladder space as each layer was imposed. In all three layers were employed, two being completely buried, the last used as a finishing suture to close the margins of the wound, after which colpoperineorrhaphy, after Martin, was done with slight modification. The immediate results were satisfactory, and the patient was dismissed May 24, 1890.

Seven years afterward I had an opportunity of examining this case, and much to my gratification she had remained well with the exception of slight retroversion.

Other cases were done in this way prior to the year 1888, but my notes on them are missing, consequently this one is employed for illustration.

Case II.—Mrs. M. E. D., aged thirty-three years, admitted to King's Daughters' Hospital, September 11, 1888. Hard-working woman, having the care and support of invalid husband, two children and herself forced upon her. The perineum was lacerated to the rectum in first confinement, five years before ; the uterus was completely prolapsed and protruding from the vulva. The bladder extruded in a globular mass about the size of a baseball. The anterior vaginal wall was very short, the posterior very long, making the fitting of a pessary impracticable. Frequent attacks of cystitis added much to her discomfort, and the prolapsus grew rapidly worse until she was forced to bed.

The heart, lungs, and kidneys were normal. Urine normal, except alkaline in reaction and small quantity of pus and albumin ; anæmia marked.

The cystocele was reduced in the manner described in the operation where silk sutures were used (Fig. 3), this being the first case in which I employed it. I first began making the diamond denudation, in preference to the oval, on account of the greater facility with which it could be done; then found that it afforded a better and easier approximation of the edges of the wound. This was strikingly apparent after putting in the small stitches across the angles. The purse-string suture naturally presented itself, and was employed to bring the sides of the diamond into the centre of the field. An important step in each of these stitches is taking an extra deep hold in the muscular coat of the bladder as well as in the vagina. This is an immense advantage over the old Stoltz operation, which only puckers the mucous membrane together.

The posterior operation was done upon this case, employing Emmet's operation on the perineum and buried catgut (superimposed) in the posterior vaginal wall. The results were excellent. The patient was dismissed October 13, 1888, and today (twelve years after) is a well, hard-working stenographer and typewriter.

Case III.—With this case I had the honor of beginning the surgical work of the Grady Hospital—the first case, the first day, the first operation. Chromicized catgut was used, closing the diamond on the principle of purse-string as described above. There was great relaxation of the vaginal outlet, requiring closure by the Emmet operation on the perineum.

The cystocele was very large, dragging the uterus so low that the cervix protruded between the labia, with the rectum rolling out behind it. She was incapacitated for work of any kind, being confined to bed the greater portion of the time, and, not being able to retain any form of artificial support, suffered frequent and distressing dysuria and fermenting and alkaline urine.

The operation proved satisfactory for five years; after that time she was lost sight of. A result of this kind in a woman

Fig. 3.

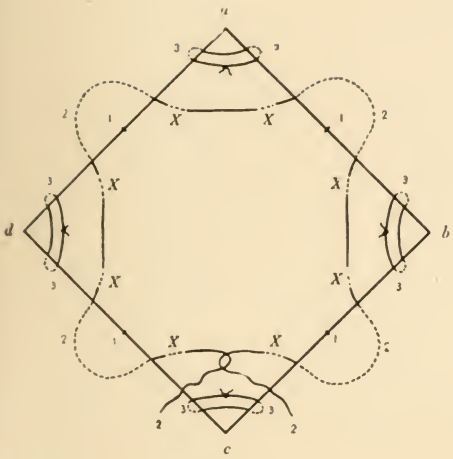


Fig. 4.

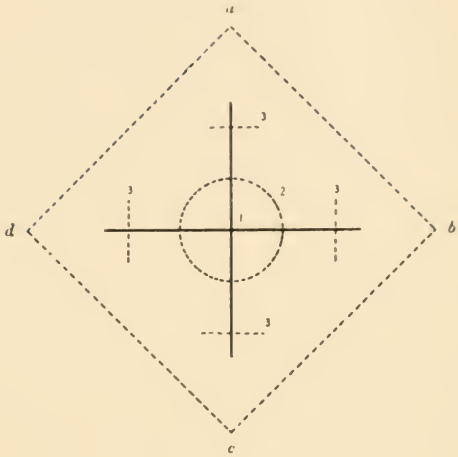
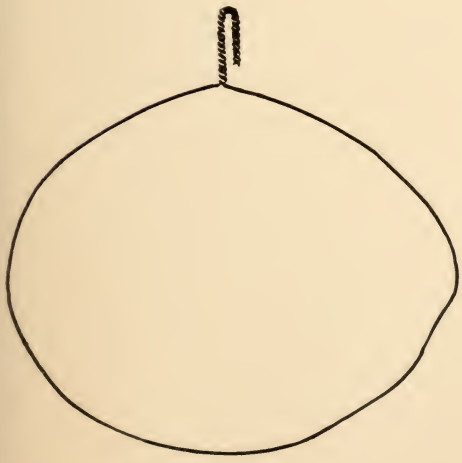
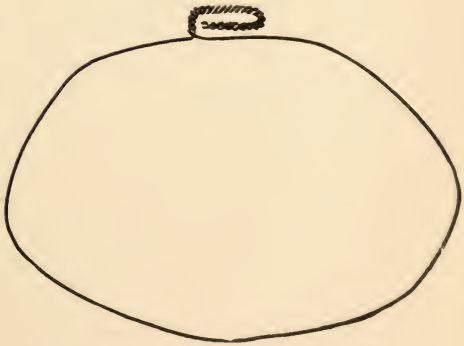


Fig. 5.



Showing first fold in wire.

Fig. 6.



Showing first and second folds in wire.

sixty years of age, who was placed in charge of the children of an orphan asylum, with the exertions her duties required, speaks well for the method of operating.

CASE IV.—Mrs. G., Decatur, Georgia, aged sixty-five years. Bladder protruding through vaginal orifice, size of a goose-egg. Painful and frequent urination from fermenting urine. Confined to bed for greater part of three weeks. Patient anæmic, relaxed vaginal outlet, no tear in perineum. Uterus senile, but engorged, enlarged, and dragged down nearly to floor of pelvis.

Operation done with assistance of Drs. Green and Thomas. Silver wire, No. 26, used. Approximation nearly circular, denudation being oval in shape. Centre imperfectly closed, leaving a slight aperture in centre, where tissues crowded together. Here the advantages of the diamond-shaped denudation were shown, as the sharp angles formed by the four sides of the quadrangle fit accurately into each other so as to prevent gaping of the wound. Success was all that could be expected. The cystocele was relieved. The dragging uterus was relieved of its strain and weight, consequently it resumed its normal position. The cystocele was not of very long standing.

CASE V.—Mrs. C. O., aged fifty-four years, admitted to Grady Hospital, July 16, 1898. Urine : Color normal, sp. gr. 1028, acid, small amount of albumin, much oxalate calcium crystals ; no casts.

Examination : Perineum torn to sphincter ani. Vesicocele, like a large pear, protruding from vagina.

Operated on July 28, 1898. Diamond-shaped denudation, wire purse-string suture buried ; superficial suture, catgut. Flap operation on perineum with wire and catgut. Stitches removed August 5th ; results perfect.

This case is selected as an illustration because the operation was done in the presence of Major McDonald, Surgeon U. S. V., of Albany, N. Y.

The diamond was drawn together with buried silver wire,

No. 28, and margins of wound whipped over with small catgut. The results were excellent, and the wire was successfully buried. At last accounts she remained well and free from polyuria or prolapse of bladder. Dysuria completely relieved.

DISCUSSION.

Dr. F. W. McRae, of Atlanta, Ga.—I wish to discuss one point in connection with this paper, and that is the buried silver-wire suture. I do not know of anything in surgical practice for which I have as strong a prejudice as the putting in of buried silver-wire sutures. Of course, the use of this suture has eminent authority back of it; it is used by a great many of the best surgeons in this country, and I still believe that these sutures give trouble in such a large proportion of cases that their use should be condemned. I have never put in a buried silver-wire suture, so that my prejudice is not due to any faulty technique on my part. I have had the opportunity of taking out several of these sutures after they had been put in by very eminent surgeons. In August of this year I removed a silver-wire suture from a man's abdominal wall (a prominent retired practitioner in Atlanta), who if he had gone until the 13th of next January would have had this suture in his abdominal wall four years. Just a little while after that I removed a buried silver-wire suture from the abdomen of my own cook. The suture had been put there more than a year before. In the abdominal wall where I removed the suture there was a tumor as large as an egg, a mass of indurated tissue presenting the appearance of a fibroid, which had given much trouble. I believe that surgeons are coming more and more to feel that these sutures should not be inserted. Just after removing the silver-wire sutures from this patient I saw another patient who had had buried silver-wire sutures introduced into the abdominal wall with the idea that there would be no hernia following their insertion. Yet each of these wires I could count as well as any of you could count the ribs in a thin man. Each one was just under the skin. The man has a hernia from his ribs to his pubes. He came to me with the idea of having an operation done to relieve that condition. I did not feel justified in undertaking an operation in his case, and I therefore recommended that he put on a corset or binder and wear it the balance of his life.

Dr. Samuel E. Milliken, of Dallas, Texas.—I heartily agree with Dr. McRae in his attitude with reference to the

buried silver-wire. I am surprised not to have heard something in the discussion with reference to the longitudinal silver-wire sutures, as advocated so strongly by Dr. Harris, of Chicago, at the last meeting of the American Medical Association.

I have been using in my surgical work since then the longitudinal silver-wire suture to the exclusion of all others, using three: one for the peritoneum, one for the muscles and fascia, and one for the skin. This suture has afforded me great comfort in eliminating the buried silver wire, as well as stitch abscess, and, while my experience has been limited, I would like to have the experience of other gentlemen regarding it.

Dr. J. Wesley Bovée, of Washington, D. C.—I do not know that I can add anything of interest to this discussion, for the reason that Dr. Noble has given us the pith of the matter in a few words.

I am as much interested in the subject of silver wire (buried) as any of you, and I agree with Dr. McRae as to the inadvisability of its use or of any other suture material that is not to be absorbed. I use silver wire considerably, both in operating on cases of vesicovaginal fistula and in abdominal surgery, for the purpose of closing the abdominal incision, but I always remove it. I put it through the muscles in those cases where I remove it, and I insert the sutures so as to close the skin with it. I use a round curved needle, carry the needle with a carrier, pass the needle just beneath the skin parallel with the skin for an inch, then carry it downward through the fascia, taking a good bite of the fascia, through the rectus muscle and into the bottom of the sheath of the rectus on one side, bringing it back on the other side in the same way. I place the sutures half an inch apart, according to the length of the incision; this brings the skin in direct apposition as perfectly as it can be done by any other method of suturing.

I have used buried catgut in my abdominal surgical work for the last four or five years almost exclusively, but I have employed quite a little silver wire during the past year in this way, and closed the wound with a subcutaneous stitch. These sutures are removed anywhere from a week to three weeks. I either untwist them a little bit at first, or lift them out, according to the amount of fat there is between the fascia and skin, cut them off, and take them out as ordinary sutures without penetrating the skin.

The operation Dr. Noble did for incontinence of urine is very ingenious. It shows that he is able to meet emergencies as they arise. When we come to consider the little devices that he has shown us in connection with this case, we get a demonstration of his personality. After all, there is much of the personal equation in surgery, and it is a line along which there is a great deal of food for thought.

Dr. Noble (closing the discussion).—It seems that the gentlemen have forgotten my operation and gone off in a discussion with reference to the use of silver wire. This operation does not depend on silver wire. Kangaroo, silk or other buried suture may be used. Years ago I used silver wire and quit it. I picked it up again, but I do not use it as much now as I did formerly. I tie vessels in the abdominal cavity with fine silk in preference to catgut, and I never have any trouble with it. In operations for cystocele, such as I have described, we know that very satisfactory work cannot be done unless we use buried sutures, because there will be so much strain that the parts will separate.

It is a common observation that things are condemned without serious consideration. One of the gentlemen taking part in the discussion, who most vehemently opposes buried silver wire, admits that he has never used it, and that he has had occasion to remove one or two pieces only. An argument from such a standpoint as this does not bear much weight. Doubtless he has had more trouble from silk sutures than is attributed by him to silver wire.

It may be well to mention the most important features essential to successful use of buried silver wire:

1. Strict asepsis. If you have had unpleasant results with your own cases ask yourself if that precaution has been observed.

2. Bury the wire deep. It should not be used close to the surface of skin or mucous membrane. It should never be used in close proximity to the intestinal canal or where it may be exposed to injury. It does not do well in muscles that are subjected to much strain or wide range of movement.

3. The sharp ends should be turned or folded under close to the point where the wires make the first twist. This is done to prevent sticking or irritation when the parts are in action.

4. They seem best when placed in fascia alone.

5. Small and very soft wire, No. 28, used in small loops, answers best. Limit the number of sutures.

6. Never twist tightly. Strain or cutting will cause the suture to come away where the same would otherwise act happily.

7. Never use it in tuberculous subjects. Investigation of bad results will show that one or more of these principles have been violated.

THE IMMEDIATE HERMETIC SEALING OF SEPTIC WOUNDS. IS IT SAFE? IS IT ADVISED?

By Henry O. Marcy, M.D.,
Boston, Mass.

It is impossible to discuss the present question without recurring *de novo* to the fundamental conditions of wound repair. The first striking contrast in the healing of wounds which interested Lord Lister in his earlier investigations was the reason why a compound fracture presented such dangerous complications when the seeming addition to the simple fracture was only an opening through the cutaneous structures. It was easy to determine that it was not simply, *per se*, the superficial wound which added to the gravity of the danger. In what did it consist? The accepted answer to the question to-day is the addition of a certain known factor of a definite vitalized type—bacterial infection. Upon the exclusion of infective germs is based the revolution in modern surgery which has yielded such marvellous fruitage.

And yet the question may not be considered entirely settled when distinguished practitioners like Dr. Granville Bantock, of London, and Dr. George Wilson, a prominent English medical health officer and president of the Section of State Medicine at the recent annual meeting of the British Medical Association, furnish prominent addresses within the year, the keynote of which in both is that the constant presence of micro-organisms, more usually regarded as specific causes of disease, are associated with the disease only because they here

find the conditions necessary for their development—that is to say, that their presence is the result rather than the cause of the pathological conditions found. So impressed with this belief is Dr. Bantock, long one of the leading surgeons of London, that he concludes his address as follows: "All these things which are facts, not opinions, capable of demonstration and proof, go to show that the modern doctrine of bacteriology is a gigantic mistake; that we are already at the parting of the ways, and that it is safe to predict that ere long it will come to be recognized that these various bacilli play a beneficent rôle in the economy of nature."

Dr. Wilson concludes his interesting address thus: "In addition to the pathogenic microbes there are always other conditions—conditions of soil and circumstances—without which the microbe is powerless. With these conditions we can always deal more or less effectually, and our most successful efforts must always remain based on these lines."

For my own part I am glad to have such able advocates as the above-quoted authorities emphasize the proper consideration of the very important factor in wound treatment as well as in disease, viz., the condition of the structures with which we have to deal. Viewed from my stand-point, the consideration of the *soil* is of importance second only to that of the *seed* which may be implanted therein. Upon these two subdivisions of the question—their proper consideration and relationship—depend the whole practical deduction: the better methods of wound treatment.

With seeming singular temerity nature has harnessed in for constant, beneficent service a variety of bacteria, the misplacement of which, however, may be fraught with the direst disaster. Familiar illustrations of this are found in the life-history of the bacillus coli communis which serves such an important rôle, when in exercising its normal functions it aids in the disintegration of the waste material within the alimentary canal. If for any reason it is unable to escape from the appendix vermiformis, its colonization within this member becomes the source of the gravest danger.

The micrococcus albus is a constant factor from infancy to old age, aiding in the disintegration and destruction of the dying epithelial cells of the skin. *Misplaced* beneath the integuments their development may be the cause of the most serious consequences. The hand of the surgeon, on this account, is often the most dangerous factor in operative surgery—a fact the demonstration of which has been so often repeated that few now question its importance or gravity.

Having conceded the importance of bacteria as a cause of wound infection—and the evidence of which is so conclusive and convincing that few will question it—our attention is very properly called to a careful consideration of the conditions and surroundings which render their probable development a dangerous factor to the individual. The simplest illustration of favorable conditions may be cited as follows: Given a localized germ-infection in well-vitalized structures, as in the prick of a finger, note the results: detachment of nature's flying cohorts, the white blood-cells, are immediately summoned, surround and shut in the growing colony, and, in favorable conditions, a minute abscess is the result and the expulsion of the invaders. In a simple incised wound in well-vitalized aseptic structures held at rest in coaptation the same cells form a plastic reunion, and, little by little, become changed into connective tissue cells, and the repair process is complete.

Surgical technique may be defined the art of making in aseptic structures an aseptic wound and maintaining it aseptic. To this end note the complexity of preparatory detail for any major operation. I will grant to a critic like Dr. Bantock that there can be little question that in the desire of many operators for originality of technique the average surgeon is confused with much that is of little value, and that oftentimes in the perplexity of the multitudinous minutiæ very important fundamental conditions are underestimated or ignored. Doubtless owing to this more than anything else has arisen the oft-repeated acrimonious discussions as to cleanliness in surgery, the use of antiseptics, etc.

It may be assumed that no one would claim that harm arises from a sterilized *circumfusa* of the part to be operated upon. If no harm and a possible good, any objection thereto is hypercritical. To attain this antiseptics must be employed, and, so far as possible, heat is the most satisfactory agent. This is easily applicable by the usual methods of steam sterilizing to towels, instruments, etc.—in fact, to everything needful except the living structures of the patient, operator, and assistants. The demonstration is now ample that we have less to fear from the bacteria floating in the atmosphere than was formerly believed. But even now few would have the hardihood to question the dangers which may arise from a dust-laden atmosphere. Hence, cleanliness must consist, in part at least, in a clean surgery, as far as possible free from dust-laden air currents.

The integuments of a patient about the operative site must also be clean, by which we mean the removal, as far as possible, of every loosened epithelial cell, secretion of the sweat-ducts, as well as the extraneous material which may be attached to the skin. For the same purpose, and really far more important, is the care which must be given to the hands of the surgeon and his assistants. Repeated experiments of the most exact and convincing character have shown, without a question, the danger which may ever lurk under the finger-nails of the operator, even after the most careful mechanical and chemical disinfection. It is on this account that the sterilized rubber glove comes in as one of the most important of the recent contributions to aseptic operative technique. In addition to the above, the irrigation of wounds with antiseptics is still thought valuable by very many of our best operators, as a further precaution for maintaining a wound aseptic.

As will be noted, I have referred to technique in something of detail, for the purpose of showing the emphasis which many surgeons make upon painstaking aseptic methods, which I most heartily approve and consider of the first importance.

The criticism that follows, however, has ample justification. The surgeon must not alone be a scientist, which includes the

familiarity of a technique as outlined, to be carried out with the automatism of a well-mastered ritual; an equal familiarity with the anatomy of the parts and their relationship; but to this should be added other almost equal acquirements, those of the *artisan* and the *artist*. There is no excuse for bungling over wounds by the hour, devitalizing their structures by the application of dozens of strong forceps, leaving tissues shreddy and half-disorganized, all done in a so-called painstaking attempt at aseptic technique; and, on this account, comes the well-merited, impatient protests of great surgeons like Dr. Bantock, with a justification in the appeal that the *soil* is as important as the *seed* in every surgical procedure. Add to the above picture the application of very many ligatures, no matter how fine, and cut short, almost invariably applied with force sufficient to necrose the enclosing tissues, and we may well wonder that nature is able even in aseptic wounds to rescue the work from complete destruction, much more that primary repair ensues.

The time certainly has arisen—since unfortunately every tyro in the practice of medicine has an ambition to call himself first a surgeon—that an earnest protest be made against the unnecessary mutilation of the structures operated upon, and that we hold up in admiration the earlier methods of the great masters in surgery, who prided themselves upon the skill and rapidity with which they made their clean-cut wounds.

In wound technique, then, what have we to advise? A recognition of the vitalized structures with which we have to deal; to injure them by clean dissections as little as possible; to remember that even the largest vessels require comparatively little force for their occlusion, and that coaptated, well-vitalized structures held at rest furnish a minimum of exudates; that it is of the first importance to preserve these for the repair of the tissues; that, on this account, the drainage-tube has been wisely abandoned, harmful as a foreign body, liable to be the "open door" for the ingress of bacteria and the very means of permitting the escape of "nature's first

aid to the wounded"—the vitalized serous effusions and leucocytic proliferations.

In all large aseptic wounds it is hard to overestimate the importance of the coaptation of like structures with their retention at rest. In order to accomplish this it is now the generally accepted practice to rejoin, in a more or less careful way, the structures by the use of buried sutures, and by the general consensus of the best surgeons these sutures should be absorbable. For many reasons I think well-selected fine tendons furnish the preferable material. Without the actual demonstration as to cause, I have long since observed that the suture material serves a better purpose by being antiseptic rather than aseptic, and for this reason have urged the importance of soaking the tendon for half an hour or more in a 1 : 1000 bichloride of mercury solution, taking the suture directly from the solution as required for use. One of the great advantages of wire is that it is impermeable. This pertains almost entirely to silkworm-gut, and scarcely in a less degree, for a considerable period, to well-selected and prepared tendon, while the *twist* in catgut and silk afford multiple recesses for foreign material.

One of the advantages of the rubber glove, of no secondary importance, is the safer handling of the suture material, since the irregular spaces of twisted sutures and ligatures, drawn through the unprotected fingers, frequently cause a dislodgement of infective epithelial cells. This, of course, pertains in a much less degree to smooth suture material—*e. g.*, wire, silkworm-gut, and tendon. Tissues thus united should leave no pockets for blood clots or effusions.

The cleanly dissected structures, devitalized as little as possible, are best coaptated by fine continuous sutures, taken deeply through the structures from side to side, which, when drawn upon, evenly coaptate the tissues and cross the line of incision at right angles, leaving no foreign material between the readjusted parts.

The skin itself should be evenly coaptated by a subcuticular, continuous, absorbable suture applied in the same manner.

In this way well-vitalized aseptic structures are held in even coaptation at rest.

This having been effected in aseptic wounds, what further duty has the surgeon to perform to aid in the reparative process? To wit, only to take care that the infracted surfaces shall be protected during the process of repair from the invasion of bacterial infection. To this end we are all familiar with the most extraordinary painstaking and multiple processes of dressing devised and insisted upon as important earlier by the founder of antiseptice surgery. I think the largest criticism of modern aseptic technique in wound treatment is in following these methods. Upon this I have insisted for many years, and it is possible this paper would not have been written had not a recent visit to a number of the leading hospitals in America demonstrated to me that such methods of wound treatment were still the routine practice of many of the prominent surgeons of our country

Permit me a single illustration. A feeble boy, perhaps eight years of age, had just been operated upon for the cure of an inguinal hernia. The only criticism in technique worthy of mention was the closure of the skin by the through-and-through interrupted silk suture for the purpose of coaptation, the sutures, of course, to be subsequently removed. Dusted with an antiseptic absorbent powder, sterilized gauze dressings were applied in many layers. These were retained by a roller bandage, over all thick masses of cotton, and splints were applied to both legs—the little fellow mummified with bandages to double his size, reaching from navel to knees. "Wherefore?" asked I of the distinguished surgeon. "Of doubtful value, but it has long been the custom in this hospital," he replied.

Dr. Andrews, of Chicago, last month reported the result of a recent visit to Bassini at Padua. He closes his description of his operation for hernia as follows: "After dressing the whole is encased in wet starch and lime bandages from the middle of the thighs to the middle of the abdomen. This

forms a support only a little less rigid than plaster-of-Paris. Dressings are changed only once, on the eighth day, when the patient is allowed to be up and about."

Granting that the protection was complete, which, however, I think exceedingly doubtful in children, because of urinary and fecal defilement, think of the torture inflicted by such methods of enforced restraint. What is the plea of the advocates of such dressings? That which pertained only recently for the retention of the drainage-tube, the escape of a possible imprisoned bacterium, and the absorption of a doubtful wound secretion, besides the prevention of the ingress of extraneous material.

If our science, our theory, and practice go for anything, the making and maintaining of an aseptic wound in aseptic well-vitalized structures is the practical issue sought and to be attained. This effected, with coaptated-like structures with like, held at rest by buried aseptic, absorbable sutures, the only factor remaining to complete our ideal technique is a dressing for the purpose of preventing subsequent infection. This is secured so simply and easily by iodoform collodion, strengthened by a few fibres of absorbent cotton, that this dressing reaches an ideal completion. It is *fluid-proof*, in that no exudate can escape from beneath it, and, as a consequence, it is *germ-proof*, in that by no means is it possible that any foreign material can enter the wound. Beyond this it holds in even coaptation at rest, with a certain fixity of support, the approximated parts. Water does not loosen it, and it is detached from the vivified cutaneous cells beneath only by the slow separation of the exfoliated epithelium. If for any reason it is needful to remove it, it is easily effected by soaking it in alcohol or ether.

The late Dr. John P. Maynard, of Dedham, first made the discovery that the cellulose of cotton fibre was soluble in ether and alcohol, and more than forty years ago gave to the profession the very valuable substance called collodion. Early it was applied for the healing of wounds, those of a slight character oftentimes healing by primary union under its pro-

tection. It was popularly called "artificial cuticle," but naturally fell into disuse, because when it covered septic wounds it was in the highest degree harmful.

Iodoform is soluble in it, and is not injurious to it, and ordinarily I think it is of little additional value. Under certain conditions I believe it to be inhibitory to the development of the micrococcus albus in the proliferating epithelium, and quite as valuable in this direction as the silver salts, which are much more difficult of application. To one who may doubt the effect of a potent agent seemingly locked up in a collodion film, we need only to cite the powerful vesical effect of the cantharidal collodion.

A wound made and maintained aseptic in aseptic, well-vitalized structures, held at rest in easy coaptation by buried tendon sutures, sealed with iodoform collodion, will not suppurate and will be followed by a non-inflammatory primary union.

The fear, the anxiety, the constant supervision and watchfulness of nurse and attendant are entirely obviated. Wound supervision is finished before the patient leaves the surgery. Subsequent dressing is of no avail except to keep the parts from extraneous injury. *The work of the surgeon for good or ill has its finality at the single period of manipulative intervention.*

BEEF-GALL ENEMATA IN THE TREATMENT OF POST-OPERATIVE OBSTINATE CONSTIPATION AND INTESTINAL OBSTRUCTION.

By F. C. Ameiss, M.D.,
St. Louis, Mo.

Whenever an anæsthetic has been administered for a surgical operation, especially when complete anæsthesia was needed, the surgeon always highly appreciates the first thorough bowel action, for he knows that the paralyzing effect of the anæsthetic on the intestinal tract may be the cause of a fatal termination. Particularly have I reference to the operation of abdominal section, but even in general gynecological and surgical procedures, requiring anæsthesia, the first post-operative intestinal evacuation is of great importance. Aside from the anæsthetic effect, there are many others which must be considered. The shock of a severe operation, septic infection, or injury to the nerve-supply of the muscular coat of the intestine may induce paralysis of peristaltic movement and thus cause intestinal obstruction (Rohé, *American Journal of Obstetrics*, October, 1894). Additional causes, of a mechanical nature, according to the authority just cited, are adhesions, peritoneal bands, volvulus, accidental fixations by sutures, etc.

Permit me, gentlemen, to present my usual method of obtaining a movement from the bowels after, for example, an ovariotomy. On the beginning of the third day an enema of one pint of warm water with soapsuds and four ounces of olive oil is ordered to be given with the long rectal tube. If

no evacuation results within four hours, the enema is to be repeated, replacing the olive oil with four ounces of glycerin, administering at the same time, *per os*, one drachm of magnesia sulphate in the juice of one lemon and six ounces of water. When tympanites is present I usually order an enema of half an ounce of turpentine, four ounces of olive oil, and one pint of warm water. If not effectual, the above dose of magnesia sulphate is to be repeated every three hours, for three or four doses, discontinuing the enemata. When vomiting coexists, calomel, in one-quarter-grain doses, given every hour, until eight or ten doses are administered, frequently both checks vomiting and produces purgation. When these simple means have failed, enemata of eight ounces of beef-gall and eight ounces of water have, in the case of several of my patients, saved reopening the abdomen, which generally gives but a desperate chance for recovery. In a recent operation for partial intestinal obstruction, I found, on opening the abdomen, the intestine looped doubly and intimately adherent to a pelvic exudate. The tubes, ovaries, and uterus seemed normal in size and appearance. I detached the bowel adhesions and sewed up the abdominal wound. The patient vomited twice from the chloroform and seemed to do well on the second day, but forty-eight hours after the operation I found her vomiting fecal matter, with a pulse of 56 and a temperature of 97°. A hypodermatic of strychniæ nitras, gr. 1–30, was administered immediately, and eight ounces each of ox-gall and warm water injected high up into the rectum. This caused a small evacuation and cessation of vomiting, which, however, returned during the night (the enema having been given at eight o'clock in the evening), and the next morning I found her in *statu quo*, pulse 62, temperature 97°, listless, abdomen tympanitic, and vomiting stercoraceous matter. I again ordered strychnine, gr. 1–30, hypodermatically, every four hours, and administered, personally, the high enema of beef-gall and warm water, each eight ounces. I found that the rectal tube doubled upon itself about five inches above the anus, but, after repeated trials, I introduced

it eleven inches and obtained within half an hour a free passage of flatus, with a good fecal movement. The vomiting ceased at once, and the patient's features cleared up, and I felt satisfied that the worst was over. I was obliged to continue the ox-gall enemata for three weeks, giving an enema of six ounces of ox-gall and water every second or third day. I tried less ox-gall, but ineffectually.

This patient was placed under antisyphilitic treatment and was kept under observation for six weeks after the operation, during which time she improved in every way. The pelvic exudate diminished considerably and no intestinal constipation recurred, and I have heard since that she has entirely convalesced.

This is the only case the writer ever saw which recovered in which genuine fecal vomiting was present.

I take it that the pre-operative symptoms of intestinal obstruction were caused by the peculiar bowel adhesions, almost obliterating the lumen of the gut, and that the post-operative symptoms were due to the attempt of re-attachment of the separated raw surfaces to the same sites from which they had been detached, which must have been prevented by the peculiar action and property of the ox-gall.

The treatment of intestinal obstruction by beef-gall enemata was first introduced to my notice by an article of Dr. Tuholske, read before this Association at St. Louis, two years ago (SOUTHERN SURGICAL AND GYNECOLOGICAL TRANSACTIONS, vol. x., p. 211). He emphasized its efficiency, which induced me to give it a trial as soon as occasion would offer, particularly as I at the time had had a death caused by intestinal obstruction following the removal of an ovarian cyst. Having used beef-gall in four cases, I now believe that with its use I would have certainly saved that patient's life. And you all know what regretful moments these fretful thoughts bring forth during a worrying night's repose. Permit me, therefore, gentlemen, to record this case, which I hardly consider a very agreeable duty ; for we all, naturally, prefer to present our successful operations. The

tumor, removed from a healthy woman, fifty-three years of age, was a left multilocular ovarian cystoma, weighing from ten to twelve pounds. It was an easy operation, without any complications whatsoever. The small, thin pedicle, after ligating and cutting it off, gave a raw surface of not more than three-quarters of a square inch in area, and to it the death of my patient is to be credited. I dropped this pedicle stump into the pelvic cavity, without first having sewed it over with peritoneum, a procedure which many an operator fails to do, particularly with so small a raw surface. I shall in future always cover the stump, whenever possible, even if the cut surfaces seem yet so insignificant.

The patient did well until the fourth day after operating, when a slight chill occurred. The temperature now was 101°, pulse 98. Her bowels had been moved the day before by an enema of glycerin and water, and she had passed flatus quite freely for several days. She complained of no pain at all, but some tympanites could be elicited through the abdominal dressing. A bottle of citrate of magnesia was ordered, which produced slight and frequent actions. The temperature dropped to 99.8° by evening of this day, and did not rise above 100° until the afternoon of the fifth day, when temperature and pulse began to increase. At 6 P.M. the temperature rose to 101° and the pulse to 120. Slight regurgitation of "hot, sour water," as the patient expressed it, was first noted at this time. Desiring to check the irritability of the stomach and to thoroughly evacuate the bowels, one-quarter-grain doses of calomel were administered hourly, but with no effect. High enemata of turpentine, oil, and warm water brought away some flatus, but gave no relief otherwise. By the next, the sixth day, stercoraceous vomiting set in, and it was decided to reopen the abdomen. I expected to find pus in the pelvis, considering the case one of insidious septicæmia (Engelmann, *Gynecological Transactions*, 1884, vol. xx.), but Dr. Dorsett, who was the consultant in the case, and who rendered valuable aid at both operations, did not concur in this opinion, stating that he expected to find no pus, but

intestinal adhesions only. In explanation of his views, he referred to a case of vaginal hysterectomy, in which, with almost the identical symptoms of my case, extensive bowel adhesions were discovered at the post-mortem.

On reopening the lower angle of the abdominal incision and exploring the pelvic cavity, a loop of gut was found adherent to the stump of the pedicle, which was separated, the cavity irrigated (as there was some bleeding), a drainage-tube inserted, and the wound again closed. No other pathological conditions were discoverable.

The patient rallied poorly and needed hypodermatics of strychnine and digitalis to prevent complete collapse; but finally the pulse again developed force, became regular and stronger, and hope once more dawned, but only for a couple of hours, when one could see that death would soon end the struggle.

A post-mortem was obtained, which plainly showed the former site of adhesion of intestine to the stump of the pedicle. A portion of ileum, flexed doubly upon itself, was resting on the stump, and the serous layer of the gut showed distinctly the site where the adhesions had been separated. No other abnormal or pathological condition was found; no peritonitis and no septic infection were demonstrable.

Had I given this woman a beef-gall enema at the stage when the vomiting set in, I believe that it would have effectually moved her bowels and thus prevented the fatal result.

When a diagnosis of post-operative intestinal obstruction is made, reopening of the abdomen is considered the only proper treatment, but nevertheless there are cases in which, on account of the general condition of the patient, the great shock of the primary operation, or accompanying complicating diseases (as a case of mine with chronic nephritis), the secondary operation cannot be performed. And in just such a case I had a satisfactory result with ox-gall. This case, complicated with morbus Brightii, was operated on for an ovarian cyst, which was adherent to the uterus, omentum, and bowel. Suspecting that the gut might again become adherent

to some of the denuded surfaces, I began early, thirty-six hours after operating, to get a movement from the bowels. When the glycerin enema and salt, *per os*, failed to act, I ordered a gall injection, with good results. Whenever numerous adhesions have been separated, the early resort to means for evacuating the bowels (which will cause free intestinal peristaltic movements), I believe, will frequently prove the factor in avoiding serious consequences. My third case, amputation of the cervix uteri and perineorrhaphy, for years chronically constipated, reacted not, post-operationem, to her usually effectual enemata, but responded well to ox-gall. In the fourth case, from which a large fibro-cyst of the uterus was removed, no action resulted from the bile enemata, and here the autopsy gave purulent peritonitis.

There are certainly a great number of cases in which nothing but operative interference can give relief. The mentioned case of peritonitis, if reopened in time, might have been saved. When a loop of gut is accidentally ligated, release of the ligature only can prove effectual. In such and similar cases the second section must be considered the only correct treatment. As we, however, do not know what we will find on reopening the abdomen, the ox-gall enema may generally be given a trial before resorting to the knife.

Of course, I recognize that four cases are insufficient in number to form a basis for extensive or dogmatic conclusions, but it is nevertheless a fact that very beneficial results were attained when the opposite was expected.

The bile I used in my cases was fresh from the slaughter-house, in several instances still possessing the body-warmth of the animal. I have used bile two or three days old which acted well, but it was darker and thicker in consistency than the fresh, and I suspect that age may deteriorate it, as the always present ingredient, mucus, decomposes very readily.

The physiological action of a beef-gall enema is very likely similar to that of the bile secreted in the human body. Landois, in his *Text-book of Human Physiology*, considers bile a natural purgative, causing intestinal peristalsis by exciting

contractions of the muscular coats of the intestine. He claims it to be a good antiseptic, diminishing putrefactive decomposition of the intestinal contents, probably the explanation for the instant reduction of tympanites which was observed in two of my cases.

That beef bile, used per enema, has the special property of insinuating itself in the narrow spaces of the intestinal tract and travelling upward (termed anti-peristalsis by Tuholske), is claimed by some, but aside from the local, mechanical effect, there very likely is one brought about by the absorption of the bile salts, taurocholate and glycocholate of sodium, which are said by the physiologist Paschki to be the main excitors of prompt and distinct cholagogue action.

Searching the literature on ox-gall, one will recognize it as a remedy of considerably antiquity. But as to its administration *per enema* very little has been written. Only one reference to the subject-matter of this paper have I been able to find in my reading. Dr. Alnate, in the London *Lancet*, writes: "In all cases of incipient constipation, administered in the form of enemata, ox-gall is a remedy of undoubted efficacy; and even in protracted cases, where hope has almost fled, but where evidences of strangulation are not unequivocally manifested, it should never be omitted." A teaching to which I emphatically subscribe.

THE DIFFERENT PHASES OF ELECTRIC TREATMENT.

By J. McFadden Gaston, M.D.,
Atlanta, Ga.

A thesis on electric therapeutics, in the Portuguese language, formed the basis of my application twenty-five years ago for recognition by the Imperial Academy of Medicine, Rio de Janeiro, Brazil.

I defended successfully the points presented in that paper on the electric treatment of diseases of various kinds before the medical faculty, and incidentally referred to the electric current as a fluid. One of the professors raised an issue upon my use of the term fluid in this connection, stating that there was no similarity to water or other fluids. In my rejoinder to his criticism I remarked interrogatively: "If it is not a fluid, what is it?" And the professor promptly said he was satisfied, and this closed my examination in his branch.

This question remains unanswered after the lapse of a quarter of a century, and while, like faith, electricity is the evidence of things not seen, it shows its fruits in works of the most potential order. All the effects of electricity depend upon this: the separation into positive and negative currents, terminating in corresponding electrodes. The development of a great force, which may be utilized either in the cure of diseases or in industrial operations, has grown out of the mechanical appliances resorted to by experts in electrical works.

Preliminary to any details of the application of electricity as a therapeutic agent it is proper to notice the various sources of electricity. Commencing with the experiments of

Franklin with the kite and a wire, by which it was demonstrated that electricity passes from the clouds to the earth, practical observations upon this means of manifesting electric phenomena have been made which go to prove that all bodies are endowed with what may be styled latent electricity. This holds in regard to inorganic as well as organic bodies, and it only requires the resort to a certain process to develop manifestations of electricity. The Leyden jar is the most simple contrivance for exhibiting the local accumulation of the two elements of static electricity, which are kept apart by the non-conductor of glass until a jointed metallic conductor is brought in contact with the inner and outer surface of the glass jar, which has a coating of tin-foil covering the lower portion of the jar. Static electricity is generated and collected by processes with which all who have been in a chemical laboratory are familiar, and needs no elucidation.

The other modes of generating electricity are recognized generally by the names of those who have invented apparatus suited to the different modes of manifestation, such as Volta, Faraday, and Galvani. Independent of these exhibitions of electric force the dynamic current is derived from a permanent electro-magnet, in which the current is of an alternating character. This form of current possesses great electro-motor force, but is practically the same as the faradic current, and not so well adapted to the treatment of diseases.

I must take it for granted that the first principles of electric treatment are understood, as it is not within the scope of this paper to go into any detailed account of the apparatus used in connection with the various manifestations of the electric current.

The terms employed to qualify the action on the tissues are electrolysis and cataphoresis, the latter being the entrance of medicines from the positive electrode of the battery.

The continuous current is employed in applying electricity for the modification of the abnormal structure, and the negative pole is brought in contact with the tissue of the part or organ to be acted on in the process of simple electrolysis.

This is accomplished in most cases by using a needle as a negative electrode, inserted into the affected tissues. It is found that with the transmission of the galvanic current the tissue into which this enters becomes disintegrated and that small bubbles of gas escape around the needle, so that it gradually becomes loosened, thus breaking down the indurated structure.

When it is desired to convey any medicinal influence through a part that is diseased, a solution of the medicine is placed upon the pole of the positive electrode, and with the action of the electric current the medication is transmitted to the intervening tissues so as to make its appropriate impression.

The interrupted induced current from a faradic battery is usually applied in cases of impaired nerve power and paralysis or paresis, in which order of debility, not dependent upon any radical organic change in the nerve-centres, we may expect benefit. In certain forms of neuralgia and in rheumatism the inductive process may be relied on for relief in connection with medication internally and massage over the region involved.

The favorable action of a horseshoe magnetic application in some neurotic conditions is due to the recognized fact that a magnet is a magnet by virtue of currents of electricity circulating around the central mass of iron.

There are many variations of so-called electric belts and appliances which do their work upon the imagination without effecting any material change worthy of note.

The adaptation of the various forms of electricity to different diseases of a medical and surgical character has encountered opposition by gynecologists on account of the alleged adhesions of the structures involved. It is claimed that in the event of a failure to arrest the disorder and that a surgical measure should be found necessary, complications are met with from the agglutination of the tissues. That benefit is derived in some cases of uterine fibroids by the resort to electricity is generally admitted, but it is claimed by those op-

posed to its use that more harm results from its application than benefit. It should be noted that those having most faith in the electric treatment are applying it to a great variety of cases and thus speak from experience of its good effect, whereas those opposed to it refuse to put it to the test of actual use in their practice. Practical application and not theory should settle this matter.

The special favorable results of the use of electricity in extra-uterine pregnancy obtained by Thomas and by other gynecologists, prior to the rupture of Fallopian tube or sac elsewhere of the adnexa, should be limited to the death of the fœtus. It is not understood to extend to the absorption of the components of the mass, but simply to arrest of growth by death of the fœtus. It is evident that changes take place subsequently which would render an operation less dangerous in some cases, but, on the other hand, decomposition of the dead fœtus may lead to the collection of pus which assumes the nature of a diffuse abscess in the abdominal cavity, accompanied with contamination of the whole system, and in the end terminating fatally. The writer has met with such a case that was verified by a post-mortem examination and accompanied by the most offensive odor which has been encountered in any other collection of a purulent nature.

The resort to laparotomy in ectopic gestation has been attended with good results in so many instances at various stages of pregnancy as to authorize section in suitable cases, whether the fœtus be dead or alive; and it is not precluded by a previous use of electricity for the arrest of fœtal development.

The class of cases in which electrolysis and cataphoresis have been employed are generally of a benign character; but even malignant growths have been removed without resorting to the knife or escharotics of any kind. The use of a destructive process with an electric cautery has also proved effective in inoperable tumors of a malignant nature, and has advantages over those of a chemical order, such as caustic potash and arsenical paste.

Betton Massey, of Philadelphia, has the credit of introducing the electric cautery as a destructive agent in the treatment of malignant growths, and his results have proved satisfactory.

It is not my purpose in this paper to give any extended notice of the results obtained by electric treatment, but to refer briefly to the class of cases to which it has been applied with benefit.

The simplest application of the disintegrating process effected by the continuous current through a needle constituting the negative electrode is in the removal of hairs from the face, which, when done with proper precautions, do not return.

With a suitable electrode on the negative pole strictures of the urethra, the rectum, and œsophagus are relieved greatly, if not entirely cured, by the continuous current of galvanism.

Enlargement and induration of the prostate gland are treated successfully by the insulated negative electrode, and without any considerable discomfort.

Nævus and cirsoid aneurism, in which the bloodvessels are unduly developed, are found to yield under the use of the electric current connected with the needle introduced around the border of the growth of vascular tissue, so as to cut off the circulation.

In the treatment of vascular tumors of all kinds by electricity the favorable result depends upon the local coagulation of blood with the formation of thrombi in the affected mass.

Sacculated and other forms of large aneurism have yielded to the punctures with needles on each side and the passage of electricity through the sac and contained mass of blood.

Epithelioma, sarcoma, and lupus are undergoing the crucial test of clinical observation upon the results of the electrolytic process in connection with special application of active medication through the positive pole.

R. N. Fraser has recently reported his case of recurring malignant disease of the scrotum by Gaston's method of cata-

phoresis and the internal administration of Donovan's solution. Seven recurrences were promptly treated by the knife, and followed by this method until a cure, with no recurrence for fifteen months, resulted. He considers that a trial should be given all cases of recurrent disease, and no operative measure withheld at the same time to aid and supplement the action of electricity.

But, above all, early treatment is necessary in tumors of a malignant type, and it is my candid opinion that many cases will yield to electricity systematically administered in the way that Betton Massey, Fraser and myself have indicated. It has been, however, my experience that people were referred to me when all the lymphatic glands were thoroughly poisoned and when the rapid disintegrating process precluded the idea of relief by electricity.

Even the more radical measures advised by Betton Massey meet with success when resorted to early in the treatment of malignant tumors.

His results with tumors on the breast coincide in the main with mine in cases of sarcoma and carcinoma, where the microscope left no doubt as to the character of the neoplasm.

In tumors of the breast a disposition to recurrence must be met by constant and repeated applications of electricity. Cases in which cervical endometritis yielded to a limited number of applications of electricity would convince me of the great efficacy of the local application of Lugol's solution of iodine and iodide of potassium to the cervix at the negative electrode.

Such cases are amenable to treatment with intra-uterine electrodes and the Apostoli clay electrode on the abdomen, with the Apostoli bi-polar electrode, or with the Goelet intra-uterine electrode and a small round zinc amalgam or copper electrode externally.

A state of chronic invalidism with loss of flesh, constant pain, and the most marked despondency may give way to perfect health, an increase of adipose tissue, relief of pain, and buoyant spirits. But regular and systematic treatment,

attention to the condition of the bowels and to the habits of the patient, should be regarded.

These cases of cervical endometritis may be mistaken for leucorrhœa and even gonorrhœa, and it is necessary to examine digitally or by speculum for erosion, cord-like condition, and protrusion of the cervix.

Another class of cases presenting a phase of electric treatment consists of ulcerated patches due to epithelioma or varicose veins or any lack of proper vascularity of the tissues. These eroded and suppurating sores differ from the ordinary effects of inflammation in the peculiar indolent character of the skin. Very many of these show no tendency to spread, but remain for months and years almost stationary. The application of the electric current to the skin supplies a stimulus to the vasomotor nerves, and a new growth of cells may result.

In these cases Donovan's solution may be used by cataphoresis, and is an excellent antiseptic and germicide. At the same time blisters are the result of a strong current, with the electrodes within a few inches of one another. These blisters at times give some concern to the patient, but are uniformly satisfactory, forming simply a dense scab resembling a button, even when quite extensive.

Many cases of atrophy of the muscles are due to deficient innervation and only require an active agent, like Lugol's solution, to respond to treatment thereby.

Techsner has reported such cases to be benefited by certain gymnastic exercises, but in the case of a man earning his living by the exercise of these muscles a sufficient use of them may be already present, and only a comparatively penetrating agent, such as molecular decomposition, may arrest further atrophy.

Hemorrhage from the nose is a frequent symptom of malignant tumors of the nostril, and yields readily to the interpolar action of electricity. Granulation may progress favorably when aided by a decomposition of cells already thrown off in the granulating progress of repair.

But it is in inoperable tumors and remote and obscure masses of tissue, such as stricture of the œsophagus, rectum, or urethra, aneurism of the aorta and angioma of the mediastinum, that the current of electricity holds a place by itself.

In many vascular masses and surfaces the positive needle may be necessary to arrest hemorrhage; but, as a general rule, the needle should be used on the negative pole, while the sponge electrode upon which Donovan's solution is applied may be the positive.

The cases of goitre which are most directly affected by cataphoresis are the parenchymatous enlargements of the thyroid gland. The so-called cystic variety is not so readily disintegrated, and may be better treated by the needle if the electric current is used.

Hunter McGuire, of Richmond, reported some very interesting results obtained with tincture of iodine applied on cotton at the positive electrode, in doses of from ten to fifteen drops.

The first of these cases was in an old person, and the applications were made daily for several weeks. After a certain time the thyroid had decreased to one-fifth of its former size. The gland then seemed to remain stationary and to resist further treatment. But two other cases were entirely cured by McGuire, and so reported in the *Virginia Medical Monthly* for August, 1891.

It was partly due to these results that I undertook to treat all malignant growths by cataphoresis.

The cases of goitre coming under my personal observation have been treated after the manner of McGuire, using the Lugol solution by preference. In cases where the Lugol solution was applied to the negative pole a general erythema occurred at this electrode, and the skin afterward was excoriated and denuded; at times, even blistered.

For gentle treatment I would advise the use of two milliampères and of a small dosage of iodine and iodide of potassium. The latter drug is a test for the positive pole, where a brown color will occur if a saturated solution is traversed by a direct current of 110 volts.

In the management of the direct current a few lamps may be used in circuit so as to decrease the ampèrage. Twenty 16-candle power lamps in series will change an ordinary incandescent lamplight so as to be scarcely visible, and the current of electricity, which is generally one-half ampère, to one-fortieth of one ampère. This is equivalent to $\frac{1}{4}$ of 100 milliampères, or 25 milliampères.

This is a very useful average to establish in beginning the treatment of fibroids or of sarcoma by cataphoresis. But after a week of such applications, eleven lamps may be left out of the circuit, and thus $\frac{1}{18}$ of 1000, $\frac{1}{9}$ of 500—55 milliampères—may be used.

And now we find that we have a more decided effect. By following each application with a galvanic battery, by another with a faradic battery, we often secure admirable sedative results.

The X-rays in the treatment of diseased organs have proved efficacious in lupus, in securing epilation, in the solution of gallstones, and other oily or fatty substances. Cancers have also been benefited by the X-rays, if we may judge by the results reported by foreign papers.

The X-rays in surgery: In Chicago, Harriet Heilmuth, a child, five years old, blind for two years and a paralytic, has had her sight and the use of her limbs restored through the agency of the X-rays. Three years ago, while playing, she fell, striking on her head. The fall left her blind and with her right side paralyzed. A few weeks ago the X-rays were applied, and revealed a tumor the size of an egg pressing on the brain. The skull was trephined directly over the cyst, as shown in the skiagraph, and the tumor was removed. The child was able to move her limbs on regaining consciousness (*Christian Observer*, October 18, 1899).

More important to surgeons may be the galvanocautery, with the many devices used for snares and blades, and curettes. In polypi of the nose the galvanocautery has held a high place for many years.

In curetting indolent ulcers and tortuous suppurating sin-

uses a small, dull curette can often be introduced after cocainizing the tract, and the current can be made to so quickly pass the platinum curette that a long operation may be avoided.

Cauterization of the Fallopian tubes in cases of pyosalpinx has been followed by cures when the galvanic current was introduced at intervals sufficient to neutralize the effect of the pyogenic cocci.

The names of such men as Engelmann, Mundé, Skene, Keith, Martin, Massey and others will always shine as masters of the new method of electrical treatment, but to Sprague belongs the credit of the successful treatment of pyosalpinx with electricity by cauterization.

Varicocele and hydrocele are maladies which may be relieved by electricity, while hernia may be reduced under the faradic current. The vasomotor nerves are influenced so as to slow the flow of blood to such an extent as to coagulate at the positive pole, while the negative pole may be capable of dissolving blood clots.

In this respect also the faradic current may induce contraction of the uterus in cases of post-partum hemorrhage and secure subinvolution in all relaxed conditions of the uterus.

According to Betton Massey, labor itself, at full term, may be hastened by the use of the faradic current, which causes the pains of labor to be less, but which supplies the necessary contraction to the muscles independently. There may be some therapeutic value attached to this suggestion in cases of inertia of the womb in long labors.

REPORT OF A UNIQUE CASE OF APPENDICITIS, WITH SOME REMARKS ON TREATMENT.

By James T. Jelks, M.D.,
Hot Springs, Ark.

On the night of April 26th I received a note from Dr. A. S. Garnett asking me to see a case with him in consultation at the Arlington Hotel. I found a woman with the following history: On the Friday previous she was feeling very well indeed, and climbed Hot Springs Mountain with a party of friends. Saturday night she was taken ill with pains in the abdomen which demanded relief. Dr. G. A. Herbert was called to see her and found her suffering with pain and a temperature of 100° F. He gave her a dose of morphine hypodermatically, which relieved her of her suffering. Sunday she had some pain, with a temperature of 101° F. This lasted through Sunday and Sunday night. Monday found her free of fever with normal pulse, but slightly irritable stomach, and vomiting whatever she took. Her bowels responded to a cathartic Sunday night and Monday A.M. Tuesday her bowels refused to move; nausea increased, temperature and pulse normal, and abdomen began to distend. Wednesday bowels constipated and no escape of flatus; pulse and temperature normal and considerable vomiting, with bowels greatly distended, and little or no pain. Wednesday night at eleven o'clock she vomited stercoraceous material. It was at this time that I was sent for and met Drs. Garnett, Greenway, and Herbert in consultation. I found the abdomen distended, slight pain in the epigastric and appendicular

region. The vomited material was unquestionably stercoraceous in character. I found the temperature normal, pulse 65, full and regular; face of patient bore no marks of suffering or serious illness whatever. The gentlemen present had diagnosed intestinal obstruction, possibly from bands of adhesions. This diagnosis was encouraged by reason of the fact that six years previously she had one ovary removed by J. H. Ethridge, of Chicago. Her health did not improve after this operation, and one year ago, while in San Francisco, the other ovary was removed by a local surgeon. At this latter operation many bands and adhesions had been found, hence it was easy for us to believe in the probability of obstruction produced by bands in the present illness. In this light of the case I advised surgical interference, in the hope of saving the life of the patient. The situation was explained to her and her husband, and they readily consented. Thursday A.M. she was removed to the Ozark Sanatorium, and with the assistance of T. J. Crofford, of Memphis; A. S. Garnett, G. A. Herbert, and John A. Gaines, of Hot Springs, I proceeded to operate. An incision was made between the umbilicus and pubic regions two inches in length through the old scar. I found the omentum adherent, hence I enlarged the incision upward until I got above the line of the omental adhesions. These adhesions were separated by the fingers, and I began to look for intestinal hernia over some band. The intestines were very much distended with gas and dark in color, being in spots quite black. With the assistance of Dr. Crofford they were rolled out and covered with warm, moist, sterilized towels; we searched for twenty minutes or more expecting to find an intestinal hernia over band or bands. Failing in this, we turned our attention to the appendicular region, where we found the gangrenous and perforated appendix. This was removed in the usual manner, and the intestines rolled out of the abdominal cavity. We found the peritoneum ruptured in three places from overdistention with gas. The appendix having been removed, the abdominal cavity was thoroughly washed out with sterilized

salt solution ; the intestines also received a thorough washing in the same solution. They were now open in two places, and by use of rubber gloves on my hands they were easily stripped through my fingers and emptied of gas and feces. These openings in the intestines were closed by Lembert sutures, and the intestines replaced in the abdominal cavity. Iodoform gauze was carried to the bottom of the pelvis and around the stump of the appendix, the cavity again washed out with sterilized salt solution, and the abdominal wound closed with through-and-through sutures of silkworm-gut, and the patient carried to bed in an exhausted condition. Chloroform was used as an anæsthetic with occasional changes to ether. Dr. Gaines, the anæsthetizer, was compelled to give her two extra doses of strychnine, one-twentieth grain each. Patient died at 8.20 P. M. No post-mortem held.

Conclusion : This case teaches one lesson which was new to me, that a patient may be dying of general septic peritonitis with a normal pulse and normal temperature. In my experience this is unique.

Had I known this patient was suffering from a septic peritonitis as the result of a perforated and gangrenous appendix I would not have operated, because of the fact that such operations do no good and bring the work of the abdominal surgeon into bad repute. We may set it down as a rule, to which there are few, if any, exceptions, that general septic peritonitis of thirty hours' duration always results fatally, and that surgery offers these cases no hope.

The question of treatment of appendicitis is a very serious one, and is not yet settled. Much has been written on this subject within the last few years. About twenty-five hundred books and monographs have been printed, and the last word has not yet been said. As we see the cases they may be divided into two classes : those seen early before pus has formed or before perforation has taken place, and those seen later.

In forming an opinion as to operative or non-operative treatment, two other factors are also to be taken into con-

sideration, viz., the mortality when treated medicinally, and the operation, skill, and technique of the operator. And whether we will or not these last two elements should have considerable weight in determining the line of procedure. For instance, given twenty cases of appendicitis occurring in the course of say five years in the ordinary village or town, are the majority of patients safer under the medicinal or surgical treatment? I am not discussing the ideal treatment under ideal surroundings and by ideal operators. That is probably settled. We have facts to face, not theories. Then, what are these facts? A patient in an ordinary house attended by the average village physician is seen for two or three days and finally appendicitis is diagnosed, and if he does not operate the village surgeon is called in. Possibly in the course of his ten or fifteen years of practice he has opened the abdomen as many times, and the doctors decide to operate. What are the facts here? Simply these. It is now too late for an early ideal operation and too soon for the late operation. Still, cœliotomy is decided upon, and carried out to the best of their ability. The patient may recover, but most probably will die, and in that community operation for appendicitis is discredited. In the next case, when diagnosed early and offered, the operator remembers the result of the former patient, and declines until perforation and general septic peritonitis is set up, and then consents. The honest surgeon is willing to do all he can to save the patient, and perhaps itching for the cœliotomy and the consequent prominence which it will give him, undertakes what is practically a hopeless job.

Now, in this community, in the long run, which is the safer line for the majority of patients? We do not hesitate to say that we believe the majority of cases under these circumstances will do better under proper medicinal treatment than under surgical interference.

Again, given an ideal surgeon—with ideal surroundings and ideal doctors, who makes an ideal diagnosis, viz., in the first few hours of the attack, and who insists upon immediate operation—we dare say the majority of this class of cases under

this set of circumstances are far safer with immediate section and removal of the appendix.

Do we get the cases this way? If we do, and have an aseptic conscience and average ability as surgeons, we say operate immediately. When the case is from four to six days old we believe the answer should be different. Here we have a different set of circumstances to meet, and this patient will have a better chance for his life if we wait until the acute symptoms have subsided and operate between the attacks. We say between the attacks, for it is probable that others will follow.

What are the statistics of medicinal treatment of appendicitis? The answer to this question depends on what to the physician attending any case is an unknown quantity, viz., the character of the infecting agent and the powers of resistance of the individual. Could we have known these conditions beforehand the course we should pursue would be plain.

It may be said that when the case is one of the so-called catarrhal form of the disease (I do not believe in using such an expression) it will get well under the administration of large doses of sulphate of magnesia. Practically all such cases recover.

On the other hand, if the causes are what are known as the "fulminating kind," 86 per cent. die if not subjected to very early operative interferece.

Then we repeat, that a given case within the first twenty-four or forty-eight hours of its occurrence in the hands of a surgeon who operates frequently and whose technique is correct, with proper assistants and nurses, that patient will be safer with cœliotomy than without; but when the case is in the country or village, and seen late in the disease by the surgeon who does not operate on this class of cases often, we believe the majority of patients will do better without operation than with it.

Doctors are frequently captivated by the work of surgeons in large cities, and when that man says he operates in all cases, the surgeon in a small village thinks he must do so

also. He forgets that his opportunities to operate come very seldom, while the other man probably operates for appendicitis, as I have seen them do, two or three times in one day.

The statistics of Drs. John B. Deaver, of Philadelphia, with four hundred and sixty-eight cases in two years, or J. B. Murphy, of Chicago, or M. H. Richardson, of Boston, must be far better than those of the surgeon who opens the abdomen say six or eight times a year.

This being the case, we believe much harm may be and is being done by the cry that every case of appendicitis should be operated on as soon as seen, no matter what the stage of the disease or the skill of the attending physician or surgeon.

The result of operation in this disease depends again on whether the section is made during an acute attack or after the attack has passed off. For instance, many operators have a mortality of 15 or 25 per cent. in acute cases, with no deaths in hundreds of cases operated on between attacks.

In a personal communication from Dr. John B. Deaver, he says that in one hundred and ninety-six cases of chronic appendicitis subjected to abdominal section in the last two years he had no deaths. In two hundred and sixty-four acute cases operated on in the same time (two years) the mortality was 17 per cent. Here we have one of the most successful operators in this country, and yet in acute cases his mortality is 17 per cent. Is the mortality in cases treated medicinally any greater than this? We cannot better close this paper than by giving some statistics recently gathered and published by Dr. Charles J. Whalen, of Chicago.

Fritz says that 26 per cent. and Stimson that 25 per cent. of all cases of appendicitis prove fatal. According to Fritz, 60 per cent. of one hundred and seventy-six cases of perforated appendicitis died during the first five days, twenty-eight during the first three days, and eight during the second day, though a large number of cases of simple appendicitis are said to terminate favorably by resolution. Buel, in 1894, placed the mortality at 5 to 6 per cent., although he had col-

lected four hundred and fifty cases with only eight deaths. Deaver collected two hundred cases with only two deaths.

Armstrong says that in the leading Montreal Hospital, from 1853 to 1890, before operations were done—that is, in pre-operative days—the mortality was 23.8 per cent. He reports five hundred and seventeen cases in which the average mortality was 12.8 per cent. Of this number three hundred and eighty-nine were operated on, and one hundred and twenty-eight treated without operation. In this latter list the mortality was 3.12. Of three hundred and nineteen, eighty-one were interval cases, in which there was but one death. Of three hundred and five operated on in acute stages, sixty-three died.

"Relapsing Appendicitis." Dr. Kuemmel, of Hamburg, read a paper with this title, which was a review of one hundred successful resections of the vermiform appendix. In addition to his own cases, the speaker had collected the statistics of a nearly equal number of cases of relapsing appendicitis in which the operation had been refused. In these cases the mortality after three years was greater than in the operated cases, while the morbidity consequent upon the recurring attacks made the second series of cases incomparably worse.

Dr. Sonnenberg, of Berlin, reported two hundred and fifty operative cases, exclusive of several of tuberculous disease of the appendix. There were sixty-six cases of simple and one hundred and twenty-eight of gangrenous appendicitis. In the two hundred and fifty cases there were forty-three deaths. This mortality of 17 per cent. represents the mortality of the disease, not of the attacks.

The forty-three deaths were encountered in cases of the perforative form of appendicitis, with complications, as lung and pleural affections, thrombosis, peritonitis, etc.

Kuemmel, of Hamburg, in his statistics mentions fifty-one cases of recurrent form operated upon during the interval between attacks with but one death. Samuel Lloyd reported five hundred and fifty-eight cases, of which two hundred and

twenty-six were operated upon, with one hundred and ninety-two recoveries. In direct contrast to this two hundred and sixty-five cases were treated conservatively with only sixty recoveries.

Hawkins reports two hundred and sixty-four cases which occurred at St. Thomas' Hospital with one hundred and ninety recoveries, making a mortality-rate of nearly 27 per cent. Fifty-nine of the cases had one or more previous attacks, of which six died, making a mortality-rate of 10 per cent. under medical treatment.

Deaver (*Medical News*, December 21, 1895) maintains emphatically that early operation is the only justifiable procedure. He has operated upon two hundred cases with only two deaths, and these in the first hundred.

Herman Kuemmel (*Berliner klinische Wochenschrift*, April 11, 1898) presents a clinical study of one hundred and four cases of recurrent appendicitis in which operation was performed between attacks. There was not a death in this series.

Examination of the appendices which had been removed showed that in not one case had the organ become normal after the attack.

I have been able to collect 6500 cases which I classified under the heading catarrhal, suppurative, and recurrent appendicitis, of which 1400 were treated medically. Two hundred and fifty-two of these died, a mortality-rate of 18 per cent. Of the remaining 5100, 987 were operated upon during the catarrhal stage. Fifty died, a mortality of about 5 per cent. Of 2630 cases operated upon during the suppurative stage, 526 died, a mortality of 20 per cent.; 1483 were cases of recurrent appendicitis, with thirty-five deaths, a mortality of 2¼ per cent. Many report series of one hundred or two hundred cases without a single death. This low mortality-rate in recurrent appendicitis is due to the immunity to infection acquired by repeated irritation. It will be at once apparent to you that out of 5100 subjected to operation, 1483, or 29 per cent., were cases of recurrent form of the disease.

As a last word let me close with the following: Dr. W. W. Keen, of Philadelphia, in discussing appendicitis at the Denver meeting of the American Medical Association, concluded his remarks as follows:

"I protest against the use of opium except in rare cases, as it has a tendency to mask the symptoms of the disease and leads the patient to the grave. I protest against the argument of Dr. Niles, that every case ought to be operated upon, and the appendix is never to be left.

"Out of three hundred post-mortems on as many bodies it was found that one hundred of the individuals had had appendicitis at some time in their lives and had all recovered from the disease. I challenge the assertion that through surgical operations all but 2 per cent. of cases can be saved. I challenge any operator in the room to take one hundred well persons and operate on them without killing more than 2 per cent. We all fail, gentlemen. I do not know why, but we all fail. I do not believe in operating in all cases of appendicitis.

"I would rather have a live man with an appendix than a dead man without one. (Applause.) I do not believe with the witty Frenchman, that no case is complete without a post-mortem. (Laughter.) If the patient is no worse after forty-eight hours of observation, let him alone; let him get well" (*Western Medical Review*).

BILHARZIA HÆMATOBIA.

By Edwin Walker, M.D.,
Evansville, Ind.

The parasite Bilharzia hæmatobia has been described by numerous authors, all of whom supposed that Africa was its only habitat. All reported European cases have at one time resided either in Egypt or Cape Colony. One case has been reported in this country by Dr. D. S. Booth, of Sparta, Ill., the patient being a resident of that place, which is not far from the home of my case. He found the parasite in the urine brought to him by the father of the patient, and, after a careful perusal of his article and description of the parasite, I believe it was a case of genuine bilharzia. There was not, however, any great care taken to avoid error, and this throws a slight shade of doubt on it; still, the symptoms of the patient and the description of the parasite are almost conclusive. I will describe my case quite fully in order that you may judge for yourselves whether it is genuine or not. Every possible error was eliminated, and the parasite found in the specimen passed from the bladder in a sterile vessel, as well as that drawn by catheter. That the parasite came from the bladder of the patient there is no doubt.

On account of the rarity of the disease, and from the fact that practically no attention has been paid to the subject in this country, I have taken the liberty of presenting a full synopsis of the literature. I am indebted to my associate, Dr. James Welborn, for the microscopical and much of the detail work connected with the case, and Dr. Jesse Ramsburgh, of Washington, D. C., for a summary of the literature.

The patient, a slender, delicate-looking woman, aged twenty-eight years, and weighing less than one hundred pounds, first came to me on February 19, 1897. She gave a history of an illness dating from soon after her marriage, nine years before. She had suffered in the meantime chiefly with pain in the right inguinal region, which had been so severe as to require a great deal of opiate. The right ovary was cystic, and that was removed. The left ovary was found to be normal, and she made a good recovery from the operation, although for some time afterward she suffered considerable pain in the right side. She remained fairly well until May, 1898, when she began to suffer severe pains in the region of the bladder, and to have hemorrhages, the latter coming on at irregular intervals, rarely more than two weeks, and finally were almost continuous, and were at first supposed by her physician to come from the uterus. From this time she suffered constantly with pain in the left side near the median line just behind the pubis. She was under the care of several physicians, and it was found, sometimes at least, that the hemorrhage came from the bladder. She returned to me in September, 1899, the picture of distress. She had been much reduced by repeated hemorrhages and was suffering excruciating pain in the left side. An examination revealed a cystic ovary on that side about as large as a lemon. Her physician had attributed her trouble to this, and I concluded best to remove it at once, which I did two days after she came to the sanatorium. Her convalescence from the operation was without incident, her temperature never rising above 100° F. She had no flow of blood at the time of her admission. The urine contained a few mucous corpuscles, and had the specific gravity of 1016, but was otherwise normal. After this her pains remained the same, and the hemorrhage returned, and we soon found that the flow was entirely from the bladder, and that the urine contained peculiar looking clots, which were of blood and mucus mixed and would float. She suffered some pain every day, and was nearly always worse in the evening. The abdomen would become

distended on the left side, would be tympanitic and so sensitive that any deep pressure could not be endured. Then suddenly there would come a gush of fluid, the specific gravity of which was from 1001 to 1006, containing almost no urea, sometimes absolutely clear, and sometimes tinged with blood, and in this we found the ova of the parasite. After this there would be some relief. The quantity would vary from a few ounces to a gallon. These gushes of fluid were accompanied with discharges of gas, and the latter often came through the catheter.

The patient was accordingly anæsthetized and a careful bimanual examination made, also a deep palpation of the entire side. As near as I could tell the sac from which this fluid came was posterior to the bladder and peritoneum. I did not think it was a hydronephrosis, because it could hardly have discharged that way, besides it could have been more distinctly palpated when full, and I was able to palpate a kidney of normal size on that side. An endoscopic examination of the bladder was also made. On the mucous membrane were a few grayish-white patches, irregular in size and shape, like cicatrices. The ureteral orifices were elevated, more on the right side, and I could not get the ureteral catheter more than a few lines into the orifice. I was unable to find any opening of the sac from which these gushes of fluid came. In order to ascertain the exact nature of this discharge I had the nurse prepare a vessel which was absolutely sterile, and the moment the patient felt it coming it was caught directly in the vessel. At other times it was drawn from the bladder by catheter, to be sure nothing was mixed with it. In this fluid we found the parasite. We never found it in the urine alone. The ova, embryos, and two small young worms were found. The ova are oval, and at one end have a sharp spine, and are granular bodies .08 to 1 mm. long. We noticed amœboid movements in some of them, changing from an elongated oval to a nearly spherical form. The embryos were larger, varying from 1 to .12 mm. long, and about .05 mm. wide. They were granular also,

presenting large globular bodies called by Cobbold "sarcode globules." They had cilia or flagella all over except the point. These were in active motion, and when the embryo was free, not lodged in mucus or clots, it would swim with great rapidity. When unable to free themselves the movement of the flagella could be plainly seen. They would live in the fluid for many hours. We were unable, however, to keep any of them growing. Cobbold found that they lived longer in spring-water. If only a small quantity of urine was added they soon died. In sea-water they were at first quiet, but after twenty minutes began again to move.

Those interested in a more extended description are referred to Cobbold's excellent article for quite a graphic description of the hatching and developing of this interesting little creature.

We also found two worms which I think were young ones. They were 4 or 5 mm. long and rounded at both ends, the head being larger. A distinct canal extended throughout the whole length. Neither of them was alive. They were certainly unlike the adults as figured by Roberts and others, but found as they were, with ova and embryos of various stages of development, I have no doubt of their genuineness. I have not, however, found any author who claims to have found the adult parasite in the urine. Cobbold found one in the portal vein of a monkey, but he does not mention having seen them in the urine.

Synonyms. The name Bilharzia hæmatobia was conferred by Cobbold, and is preferred to all others by nearly all writers since his time, as it gives it a more accurate name, and at the same time hands down to posterity the name of its discoverer. The name of distoma hæmatobium, given by Bilharz himself, is objectionable, because among the distomidæ are included bisexual parasites.

Distoma capense was given by Harley, who supposed that those found in the Cape were different from those found by Bilharz in Egypt, which Cobbold shows is an error.

Gynæcophorus hæmatobium, by Diesing, is very appropriate, expressing the most distinctive peculiarity in the creat-

ure's anatomy as well as in its life-history; but neither this nor any of the remaining synonyms have found general favor, and the name of Bilharzia hæmatobia is rapidly superseding all others in the later writings of helminthologists.

Discovery and Geographical Description. The symptoms of the disease have been noted by physicians of the various parts of Africa and its neighboring islands, but more especially in Egypt. It was not until 1851 that Bilharz in conjunction with Griesinger discovered that the special symptom, hæmaturia, was due to the presence of a trematode worm and its ova. In 1857, Cobbold discovered a similar parasite in the portal vein of an African monkey. In 1864, Harley discovered the disease at Cape Colony and Port Elizabeth. Since that time cases have been reported from different places in Africa by Henderson, Allen, Atherstone and others in the Cape and Natal and the surrounding country, including the Transvaal. It is probable that the disease exists in all parts of the continent from Cairo to South Africa.

The manner in which the parasite gains access to the body is still uncertain. Griesinger suggests that the larvæ exist in river-water and fishes which inhabit it. Cobbold, that they enter the body by ingestion of mollusks which adhere to edible vegetables. Sonsins, that the worms gain access through drinking impure water. The agricultural class in Egypt, who drink from stagnant pools or running streams, are more subject to the disease than the inhabitants of the cities, who make use of purified water. Harley, Allen and others suggest the entrance, while bathing, by the small superficial veins or by the urethra or rectum. It has been suggested that the worm may deposit the eggs on the surface of the body and that they hatch out and find their entrance into the veins. Among the Boers it has been found in the males, while the females are almost exempt. It is more frequent among the boys. The explanation of this is probably due to the fact that the boys are constantly bathing in the rivers, while the girls do not, and this is an additional support of the theory that it is either deposited on the surface of the body or finds entrance through

the urethra or rectum. Newcomers, if they are adults who venture to bathe frequently, contract the disease, while others who avoid doing so escape. Those who bathe in these streams frequently complain of itching upon emerging from the water, and afterward show signs of the disease. It does not seem to be infectious by direct contagion.

Pathological Effects. The adult worm is found most frequently in the portal vein or its branches, and in the vesical veins, or in the blood clots contained in them post-mortem. The organs in which eggs are found post-mortem are the bladder, ureters, vesicular seminales, mesenteric glands, and the rectum. They have also been found in the liver, kidney, and prostate by Kartulis, in the lung by Mackie and others, and in the left ventricle of the heart by Griesinger. The cavities into which they escape most frequently are those of the urinary apparatus, the pelvis of the kidney, the ureters, and the bladder. They are almost always found in the urine, but they may also escape through the rectum, passing out with the feces.

The female worm after fecundation leaves the male and finds her way into the minute vein or soft tissue and becomes encysted. The eggs are then deposited in abundance, the veins burst, and they are set free into the cavities in the neighborhood. This rupture is usually accompanied by hemorrhage, which is sometimes the only symptom noticed by the patient. This is the chief symptom of the disease, and gave to it its original name of endemic hæmaturia. Infiltrated, congested, and ecchymotic patches, varying in size from a quarter to half an inch in diameter, covered with slimy mucus, are found post-mortem in the bladder, ureter, and pelvis of the kidney, most frequently in the bladder. These patches are usually found more on the posterior walls of the bladder. They are covered over with soft granular material, in which are often found lime salts. Sometimes these patches become the seat of warty outgrowths or vegetations. Should these be located in the ureter or kidney they may cause hydronephrosis, taking the form in the urinary organs of cystitis

or pyelitis, and in the case of the bowel, diarrhœa or dysentery.

Symptomatology. The passage of blood by the urethra is usually the first symptom. Sometimes uneasy sensations, seldom amounting to pain, are felt in the lumbar regions or about the perineum before any blood is noticed. As the patient is usually a child, the detection of blood on the clothing first directs attention. The period required for the disease to fully develop is difficult to determine. Adults develop hæmaturia after a residence at Rushenburg of four months.

The blood is not, as a rule, mixed uniformly with the urine. It is almost always passed at the end of micturition, the quantity varying from a few drops to a teaspoonful, or even a tablespoonful. After exertion the amount is markedly increased. The blood thus seems to be vesicular in origin. It may be highly colored or dark, and often passes in clots. When these come from the bladder or ureter the patient may suffer with marked colic. The hæmaturia is usually intermittent. Later more or less pain accompanies the disease, the passage of clots giving rise to pain more or less acute, and in many cases a dull, aching pain in the back is a prominent symptom. Irritability of the bladder and frequent micturition, preceded by a burning sensation and followed by smarting and straining, are quite frequent.

The disease is mostly confined to boys from six to fifteen years of age. After that age hæmaturia gradually disappears, and the other symptoms improve so greatly that the patient regards himself as cured. A careful examination of the urine will often reveal the presence of ova for many years afterward. Subsequently oxalic and uric acid calculi frequently form in the kidneys and bladder. Renal growths are particularly common. The reaction of the urine is similar to any other which contains blood, and by microscopical examination the parasite is found, usually the ova and embryos, but seldom the worms. These we find in the sediment from the urine. In my own case it was a discharge of water independent of the urine which contained most of them. Shreds of mucous

membrane containing embedded ova in large numbers are frequently passed later in the disease.

Diagnosis. Detection of ova in the urine and feces is the only method of absolute diagnosis. The urine is always acid and frequently contains crystals of uric acid. As mentioned before, the chief symptom is hæmaturia.

Prognosis. The immediate danger to life from this disease seems to be small, although it is doubtful if any of the patients entirely recover. The disease is known to recur after ten or twenty years.

Treatment. Indication (1), removal of cause. (2) Alleviation of symptoms. (3) The prevention of the sequelæ.

1. For the removal from the blood of the adult worm and ova from the organs and tissues nothing has yet been found, for the parasite taking up its abode in the interior of the vein cannot be reached except through the blood, and it is thus impossible to act upon it efficiently by means of the ordinary anthelmintics. Harley recommends a mixture of oil of turpentine and male fern for bringing away the ova. By prophylactic measures we can limit the duration of the helminthiasis ; by cutting off fresh infection limit is placed to its duration. Vesical injections have been tried with no benefit, except upon the secondary lesion, if any be present.

2. More success can be looked upon in the alleviation of symptoms. Hæmaturia should be treated from the beginning.

Usually the perchloride of iron has given the best results ; also liq. arsenicalis hydrochlor. Give this along with the iron with a bitter infusion—*e. g.*, quassia. Allen recommends the use of santonin internally, and in my case I used this remedy, and after that she improved, although the improvement was probably due to the freer flow of fluid from the cavity where the parasite was contained. Allen also recommends an injection into the bladder of five grains of santonin to one drachm of alcohol, which produces a severe inflammation of the bladder. I, however, fail to see the philosophy of this. Prohibit violent exercise or exertion of any kind, particularly horseback-riding. Prescribe complete

rest. For pain, opiates. As this is due to passage of blood clots through the uterus, give aromatic diuretics (buchu) and demulcent and diluent drinks; in later stages the pain is more probably due to passage of calculi. Treat accordingly.

Irritability of the bladder by injections, boric acid saturated solution or weak carbolic acid solution. Epistaxis, diarrhœa, and digestive disorders frequently call for treatment appropriate to their nature. The practice of masturbation must be looked to. No doubt the genitals become irritated from the excessively acid urine. The habit is exceedingly common among the victims of Bilharzia.

3. Daily use of bicarbonate or citrate of potash in weak solution is especially commendable, with the object of combating tendency to calculi. Surgical interference is sometimes, though rarely, necessary, except for large calculi in the bladder, or papillomata and other growths that are in the rectum, due to deposits of the ova.

Bibliography.

Allen. Remarks on Bilharzia. Lancet, London, 1882, vol. ii. pp. 51–53. Bilharzia Hæmatobia (translated). Albany Medical Journal, 1888, vol. ix. p. 202.

Booth, D. S. Bilharzia Hæmatobia (Cobbold), Distoma Hæmatobia (Bilharz) (case). Western Medical Reporter, 1882, vol. iv. pp. 81–84.

Bowlby, A. Organs and Parasites from Cases of Bilharzia. British Medical Journal, London, 1889, vol. i. p. 1891.

Chute, H. M. Bilharzia Hæmatobia, Distoma Hæmatobia, Endemic Hæmaturia. South African Medical Journal, East London, 1888–89, vol. iv. pp. 85–89.

Crocker, H. R. A Case of Hæmaturia from Bilharzia Hæmatobia (translated). International Medical Congress, Washington, 1887, vol. iii. pp. 420–424.

Curtis, B. F. Bilharzia Hæmatobia (case). Annals of Surgery. Philadelphia, 1896, vol. xxiii. pp. 56–58.

Dight, C. F. The Bilharzia Hæmatobia (translated). International Medical Congress, Washington, 1887, vol. iii. pp. 420–424.

Handford, H. Case of Endemic Hæmaturia Due to the Presence of the Bilharzia Hæmatobia; Second Supplementary Report (translated). Clinic Society, London, 1893–94, vol. xxvii. p. 48.

Napier, A. Bilharzia Hæmatobia. Glasgow Medical Journal, 1887, vol. xxviii. pp. 460–463; also translated. Pathological and Clinical Society, 1886–91, 1892, vol. iii. pp. 88-91.

Sonsins, P. The Treatment of Bilharz's Disease. British Medical Journal, London, 1885, vol. i. Discovery of the Life-history of Bilharzia Hæmatobia (Cobbold). Lancet, London, 1893, vol. ii. p. 621.

Zancoval, G. A Specimen of Bilharzia Hæmatobia with Ova in the Tissues of the Bladder and Large Intestine (translated). Pathological Society, London, 1881-82, vol. xxiii. pp. 410–412.

Cobbold. Bilharzia Hæmatobia. British Medical Journal, 1872, vol. ii.

THE TECHNIQUE OF EARLY OPERATION FOR CLEFT PALATE.

By James E. Thompson, M.B., B.S. (Lond.), F.R.C.S. (Eng.).

A careful study of the nasal cavity of a newly-born infant affected with a complete bilateral cleft of the palate shows the following points:

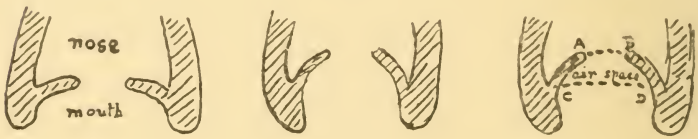
The edges of the cleft are formed by the following structures, viz., palatal process of superior maxilla in front, and behind this the palatal process of the palate bone, both being covered by the mucoperiosteal layer; still further back the edges of soft palate and uvula. Between the edges of the cleft the median septum can be seen. This consists of the vertical plate of the ethmoid and the vomer. If the cleft passes through the alveolar margin and the lips it bifurcates at the posterior end of the premaxilla and passes forward between that bone and the sides of the maxilla. The premaxilla then forms the anterior end of the septum which divides the nasal cavity into two halves. Occasionally the septum may be attached to one edge of the cleft over a greater or less extent, and then one nasal cavity may not communicate with the cleft except at its extreme anterior or posterior end.

The size of the palatal plates varies within great limits. If large, the fissure is very narrow. If small, the fissure will be very wide, and the lateral nasal cavities, with the turbinated bones, can be inspected through the cleft. In any case, the lateral nasal cavities are much smaller than they ought to be, because the bony palatal processes are much higher and more concave than in normal infants. The height of the palate is very noticeable at birth, but as age increases the lateral pro-

cesses become much higher, encroaching gradually upon the nasal cavity, until the lower breathing nasal space is almost obliterated. A glance at Figs. 1, 2, and 3 will show this point. Fig. 1 represents a section of a cleft palate at birth. Fig. 2 represents the same case at the age of three years. It will be seen that the bony plates are much higher. Fig. 3 represents diagrammatically, by the line C D, the position of the original palate at birth; by the line A B the union of the palate at the age of three years. The air space between them represents the loss to the nasal space, and the gain to the oral space during this time.

The nasal spaces are also encroached upon laterally because the edges of the cleft tend, as years pass, to grow nearer together.

FIG. 1. FIG. 2. FIG. 3.



When we examine the reasons for these changes we find that they are due to the fact that in the act of breathing no air passes along the nasal cavities, but the air-current chooses the easier route through the mouth. As a consequence, all stimulus to nasal development is taken away, and the result is that the nasal cavities become smaller by the encroachment of the bony walls of the palate and the gradual approximation of the two sides of the maxillæ.

It will be seen from the above that if we wish to preserve the relative balance between the capacity of the oral and nasal cavities, and enable the nasal cavity to develop, we must at a very early age close the cleft and shut off the nose from the mouth; and it is on these premises, and these alone, that I base my argument in favor of early operation in cases of cleft palate.

The disadvantages of a communication between the mouth and nose are threefold:

1. Danger to the life of the infant from inability to suckle.
2. Discomfort from food passing into the nasal cavity.
3. Peculiar nasal tone to the voice when speech is acquired.

The first condition need not necessitate an early operation for its removal. If the child be unable to suckle at the mother's breast, it is always possible, by a specially constructed nipple, made of rubber, to fill the cleft completely, and so overcome the difficulty; or the child can be fed by a dropper. A very large proportion of these infants die of inanition, more from intrinsic weakness of tissue than from inability to be nourished.

The discomfort arising from food passing into the nose is a serious one. Often it keeps up a more or less constant catarrh, and is a source of great annoyance. But with care in eating—in early life with a properly shaped nipple, later on with a well-fitted obturator—this discomfort is made bearable.

Defective speech is the most serious drawback. This cannot be prevented by any form of obturator, and only to a limited extent by operations which are performed late in life. If an operation is performed after the patient has learned to speak, there is very little chance of his ever acquiring normal speech. It has been said again and again that careful education and training after the operation will overcome this peculiarity; but I doubt if a single case can be produced where anything more than a slight improvement followed, even after careful elocution lessons.

Personally, in late operations, I have never seen much improvement, although I have had the luck to be in almost constant daily intercourse with two of these cases. My own idea of this is that the want of improvement depends entirely upon the inability of the patient to appreciate the fact that he speaks in a manner at all unlike normal individuals. I have had one patient, a young girl of thirteen years, who, while reading aloud at school, was wholly unaware of any difference between her own voice and those of her school-fellows. No

amount of teaching on my part would enable her to alter her method of producing sounds, because she was totally unaware that her manner of speaking differed from mine. Some cases have been reported where a new language learned after the operation was spoken without fault (Ochsner.)

Will early operation enable us to correct these faults of speech? This I am unable to answer in the direct affirmative from personal observation, but Lane distinctly avers that if the operation is performed during the first year of life false articulation is avoided. Certainly, it seems rational to believe this, and I hope in a few years' time to speak more emphatically on this subject, when my cases are old enough to be shown.

When should we operate? This is not an easy question to answer. To fix arbitrarily a given date for each and every case would be absurd on the face of it. Some babies are robust enough to undergo the operation at the end of a few months, while others cannot be operated upon until they have attained a few years. It is entirely a question of health and vitality on the part of the baby.

Lane advises that if the child is strong enough the operation should be done during the fifth week. This is rather earlier than I personally would care to operate, unless by chance I had to deal with an exceptionally robust child. One ought, however, to seize as early a date as possible, for the object is to reproduce the nasal cavity in order that the nasal breathing may favor its proper development. We must not forget that our aim should be not so much to complete the union of the palate before speech is learned, as to restore the balance between the nasal and oral cavities, so that when the child learns to articulate the sounds may be produced properly. In other words, the mere separation of the nasal and oral cavities will only partially correct the false tones, because the production of true tones requires normal anatomical structures. Lane's rules are in the main correct, but must be interpreted with a common-sense regard to the physical condition of the patient.

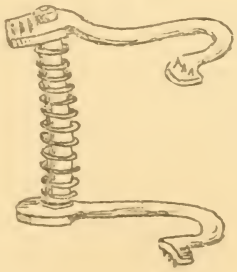
It is usually to be deplored if one cannot close the cleft before the end of the first year. During this period the teeth

give but little trouble; they do not interfere with the placing of the gag, and there is no decay. Also feeding can be accomplished by the use of sterile materials. Added to this, the parts usually bear handling with impunity, and healing processes are very rapid. Whenever possible the palate should be repaired before the lip, because when the lip is cleft we have more room to manipulate the parts. In some cases where the lip is sound, Lane remarks that he never hesitates about splitting up the lip to obtain more room, the lip being sutured at the end of the operation. Few cases, however, will necessitate such radical treatment.

The anxiety of the parents to have the hideous deformity in the lip removed as soon as possible has usually proved an insuperable objection to me, and, as most of my cases have occurred in private practice, I have yielded to the parents' request, and repaired the lip first. This can usually be done by the end of the second month; and allowing three months for firm union, we can commence repairing the palate at the beginning of the sixth month.

THE OPERATION. In children so young it requires special instruments, and I have found those described by Lane to answer every requirement. They consist of the following:

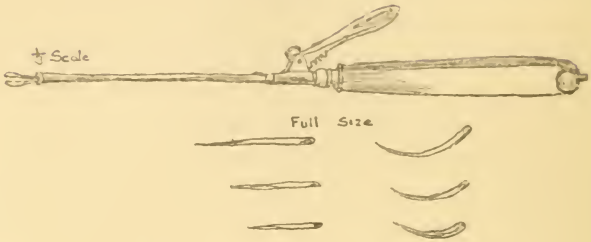
FIG. 4.



1. A perfect self-retaining mouth gag, which when once inserted needs no attention. The blades of the gag are kept open by a spring, and carry small spikes which penetrate the gum behind the molars. (See Fig. 4.)

2. A special needle-holder, to carry the small needles which are to be used. (See Fig. 5.)

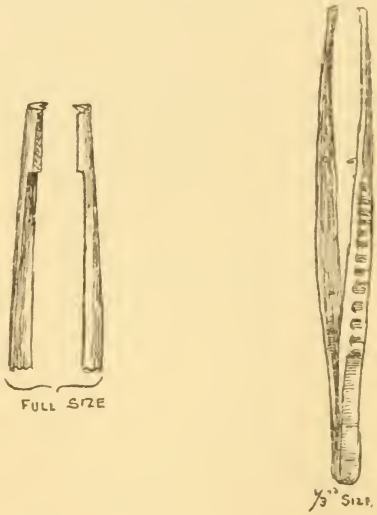
FIG. 5.



3. Special needles, both curved and straight, varying in size from three inches upward. (See Fig. 5.)

4. Fine silk for sutures. This is usually waxed, and is threaded dry, the needles with their threads being sterilized after threading.

FIG. 6.



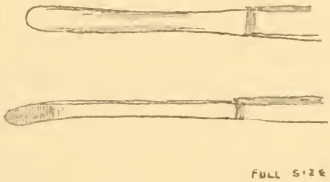
5. A pair of forceps with terminal teeth and serrated plates behind them. They are very useful for holding the flap while the needles are passed, and the serrated plates for grasping the needle and drawing it through. (See Fig. 6.)

6. Specially shaped knives for cutting flaps from the soft palate. These are blunt pointed, double edged, shaped like a spatula; one is curved on the flat and the other straight. (See Fig. 7.)

The method of operating which I usually employ is that so ably described by Lane, and planned by him as a modification of the procedure of Davies-Colley, but which deserves to be known by Lane's name. It will be easily understood by a study of Figs. 8 and 9.

From one side of the cleft a flap (A) is thrown from both hard and soft palate. It follows the line of the alveolar border very closely, and runs from the edge of the cleft in front as far as the point of junction of palate and wall of pharynx behind, thence along the posterior edge of soft palate and uvula to the

FIG. 7.



edge of the cleft. This flap is thrown up toward the median line upon a hinge which is represented by its attachment to the edge of the cleft. It consists of mucous membrane and periosteum in front, while behind the soft palate is split into two equal layers. Extreme care must be exercised not to separate the flap from its attachment to the edge of the bony palate, and in splitting the soft palate not to approach to a too near division, or the vascular supply will be interfered with to such an extent as to produce gangrene.

The cutting of the flap is a very delicate process, and if the edge of the flap is roughly handled by forceps it will be so injured that primary union will be jeopardized. It is my habit as soon as the flap is raised by the elevator from the hard palate to insert a suture through its edge as near the soft palate as possible, so that by using this as a retractor one can split

the soft palate with ease and accuracy. I also place two other sutures, one through the edge of the flap near its posterior end, the other near the anterior extremity. The three sutures thus used as retractors give us complete control of the flap.

During the cutting of the flap there is often quite annoying hemorrhage, but this can be easily controlled by sponge pressure, and if one's assistant is skilled, very little blood is swallowed. While splitting the soft palate hemorrhage may be momentarily profuse because the descending palatine arteries are severed. Pressure on these with sponges usually suffices to arrest it, but better still is pressure with the finger direct on the bleeding-point, which in a baby's mouth is within easy reach. I have never yet found it necessary to place a ligature on any of these vessels, or to seize them with artery forceps.

As soon as the flap has been satisfactorily reflected it is placed back in position and attention given to the other side

FIG. 8.

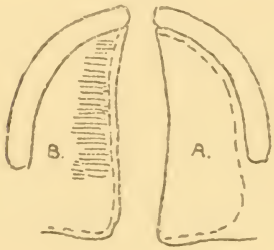
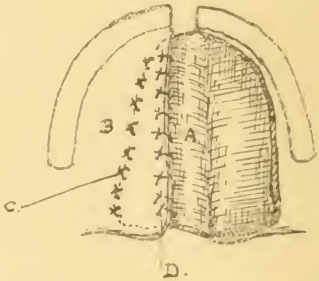


FIG. 9.



of the cleft. An incision is now made (shown by the dotted line on the side B, Fig. 8) along the margin of the cleft which separates the mucoperiosteal layer of hard palate from subjacent bone, but splits the soft palate into two equal layers. This incision is carried along the uvula and the posterior edge of the soft palate. By using a periosteal elevator the soft covering of the hard palate is separated completely from the bone (shown by the transverse shading in B.) Behind the soft palate is split for fully one-half of its lateral extent. This enables the whole flap B to be lifted up on its attachment to the alveolar margin and the pharyngeal attachment of soft palate.

For convenience of description we will call flap A the "hinged flap," and flap B the "elevated flap." The next stage is the fastening of the flaps together.

The hinged flap is now turned over with its raw surface toward the mouth and its free edge insinuated under cover of the elevated flap (Fig. 9). The two flaps are now in contact by broad raw surfaces, and are fixed together by silk sutures in the following way :

Using the special needle-holder and needles, which are quite essential, the flaps are pinned together by a number of interrupted mattress stitches (C in Fig. 9). The straight needles are used and are passed as follows: Flap B is penetrated a little distance from its edge (the distance is gauged by the distance to which the edge, flap A, is capable of being drawn), from its mucous toward its raw surface; flap A is now penetrated close to its free edge from the raw toward the mucous surface. Coming back again, we penetrate A in the opposite direction about one-sixteenth of an inch behind the first puncture, and, finally, penetrate B again from its raw toward the mucous surface the same distance behind the first puncture.

All the sutures are passed before they are tied. They must not be too numerous, else the circulation in the free edge of flap B would be endangered. When they are completed we have about six sutures which pass from the free edge of the soft palate behind to the anterior part of the palate in front. When tied almost perfect application of the raw surfaces results; but to complete we apply a second row of interrupted sutures (B in Fig. 9) by the aid of the curved needle to unite the edge of the flap B with the raw surface of flap A. This gives perfect application of broad raw surfaces represented in Fig. 9 between the rows of stitches C and B.

The operation above described I have been accustomed to modify somewhat as to the splitting of the soft palate of the raised flap B. The muco-periosteum is raised from the bone, as in the first operation. With a pair of curved scissors the attachment of the soft palate to the posterior edge of the hard palate is severed, and the whole flap B raised up with two or

three controlling suture retractors; then on the cranial surface of the soft palate a curved incision (D E, Fig. 10) is made, which penetrates the structure half its thickness. The portion of the soft palate between this incision and the free edge is now split, and, stopping about a sixteenth of an inch from the free edge, the flap is hinged toward the other side. Flaps A and

Fig. 10.

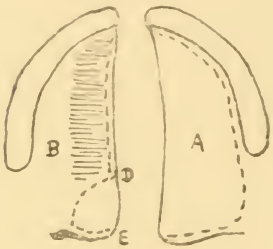
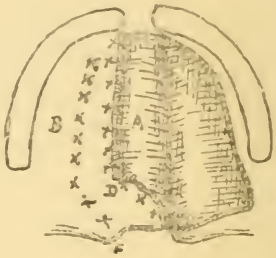


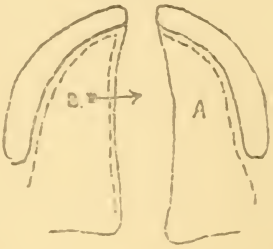
Fig. 11.



B are united as before, but a glance at Fig. 11 will show the triangular flap (D E) superposed on the hinder end of flap A, increasing the area of raw surfaces in contact.

The first operation is an ideal one, and is taken directly from the description given by Lane. It has not, however, been my luck to be able to perform this operation in babies under one

Fig. 12.



year. I invariably carefully measure the cleft with a pair of compasses, and have usually found the cleft so large that there has not been sufficient tissue on the palate to serve as flaps to cover in this defect. I have met these cases by dividing the operation into two stages—a procedure which has turned out eminently successful. When first I performed it I thought it was

original, but find it was advised by Mr. Davies-Colley (*British Medical Journal*, October 25, 1890). It will be explained by reference to the diagrams (Figs. 12, 13, and 14).

The flap A is elevated and hinged on its mesial attachment, as in the first operation. The soft palate, however, is not split, or only so much as to allow easy hinging.

The flap B is separated both along the mesial and alveolar attachments and thrown up like a tongue as far back as the soft palate.

A is then brought over on its hinge and B made to slide across until its raw surface is in contact with that of A. They are then fastened together with sutures. Union occurring, we wait for about three months and complete the operation thus:

FIG. 13.

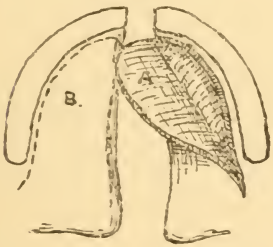
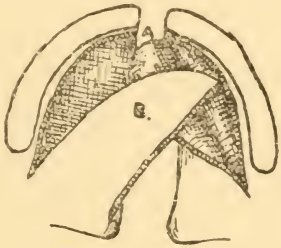


FIG. 14.



The posterior end of A is completely thrown up as a hinge flap, while B is now separated from its posterior attachments to the edge of the bony, hard palate. B is split as before, and the free edge of A is insinuated into the split and the flaps united as in the original operation.

This operation has been very successful in my hands. On completing the first stage it usually looks as if only about one-quarter of the cleft is covered, but when healing is completed and the second operation contemplated, the cleft has usually granulated up fully another quarter. In children who are not robust I am greatly in favor of dividing the operation into two stages, as above described. The advantages of this division are twofold: 1. The operation is attended with less bleeding, and consequently with less shock. 2. At the same time, and as a

consequence of the foregoing, the lip can be repaired at the same operation. In one case I performed the first stage of this operation and repaired a single hare-lip at one sitting in a comparatively feeble child of six months without the slightest serious after-results.

When I first performed this operation it was forced upon me, because, on careful measurement with compasses, I found Lane's operation an anatomical impossibility, the cleft being so wide that the palatal process did not carry enough soft tissue to bridge over it. The child was six months old, and I closed the anterior part of the hard palate. Three months later I completed the operation and succeeded in closing the whole palate. I thought the operation was original with me, but discovered that Mr. Davies-Colley had described a similar procedure (*British Medical Journal*, October 25, 1890). His method, however, differs in some essentials from my own—notably, in the way the hinged flap is formed.

Another paper by the same author (*British Medical Journal*, April 28, 1894) describes an operation that seems full of possibilities in older children. In children under one year it would in the great majority of cases be an impossibility.

I have mentioned previously that silk is the best material to use in these infants. Horse-hair is not always reliable on account of its varying strength and the difficulty of keeping the knots tight. Silver wire, which is the ideal suture in Langenbeck's procedure, is much too clumsy for the delicate flaps that we manipulate in these early operations.

I never trouble to remove the silk sutures; they take care of themselves in some strange manner. As to after-treatment, no swabbing of the interior of the mouth is allowed. The child is fed the same day with sterilized milk, and this is continued for at least two weeks. After this, if the child is old enough, soft puddings, rice, tapioca, etc., are allowed.

One must always be careful not to allow the child to use its hands. In a small baby the sleeves of the gown are pinned to the body, and the hand kept from all possible contact with the mouth.

In young babies colic will invariably occur unless the swallowed blood is got rid of as soon as possible. An enema the day after the operation is very efficacious.

In conclusion I beg to offer the following rules:

1. Operate as early as possible. Try to close the defect by the age of six months.

2. When possible, operate on the palate first, closing the lip at a later date. This sequence makes the palate operation much easier.

3. Where possible, complete the operation in one stage by the procedure described by Lane.

4. Where the cleft is too wide to finish the operation at one sitting close the hard palate first by the method described (Davies-Colley), and when granulation is completed close the cleft in the soft palate at a subsequent operation.

Literature Referred To.

Lane. Cleft Palate; Treatment of Simple Fractures by Operation, etc. Published at the Clinical Medical Journal Office, London, Eng.

Davies-Colley. British Medical Journal, October 25, 1890; Ibid., April 28, 1894.

Oehsner. Discussion of paper by McCurdy. Journal of the American Medical Association, October 28, 1899, p. 1063.

SIMPLE FRACTURE OF THE PATELLA, WITH SOME SUGGESTIONS AS TO TREATMENT.

By E. Denegre Martin, M.D.,
New Orleans, La.

This subject has been so thoroughly dealt with that little remains to be told.

Though one or two of the suggestions which I propose to introduce in the course of this article are the results of a number of experiments, yet I doubt not that they have occurred to others working in the same field, but to my knowledge they have not been acted upon.

There is no fracture in the body which gives more anxiety to the surgeon, and although the results are usually good there always exists a doubt, and under all circumstances the prognosis must be guarded.

First, as to the mechanism of these fractures. Some surgeons incline to the belief that simple transverse fractures may be due to traumatism alone. From experiments on the cadaver I do not believe such a thing is possible. If the injury is inflicted when the leg is flexed and the lower end of the patella slightly tilted, such a thing is possible, but with the leg extended and the patella resting on the femoral patella surface, with the muscles relaxed, a blow of sufficient force to cause a fracture would do serious damage to other structures of the joint. In the cases where I attempted to fracture the patella on the cadaver I found it necessary to transfix the bone in several places along its vertical axis, and used quite a little force before I could produce a fracture. When the leg is flexed and the full retractive force of the quadriceps causes

it to be suddenly jerked upward while firmly anchored below by the ligamentum patellæ the force is such as to cause a rupture at the weakest point, the ligaments being more or less elastic resist the shock, but the bone being firm receives the full force of the recoil, and usually gives way. The muscular force exerted under such conditions is great, and frequently results in widely separating the fragments; hæmarthrosis is marked.

When, however, the fracture is caused by a blow, as falling on the knee, when the quadriceps is sufficiently contracted to make it tense, separation of the fragments is less and hæmarthrosis is slight. The mooted question of to-day is the method of treating these fractures. We find surgeons divided on the subject of surgical interference, owing to the great danger of sepsis, so liable to result in impairment of the joint, and the many mechanical devices offered to the profession for treatment of fractures of the patella prove conclusively that no satisfactory plan has as yet been suggested for their non-operative treatment.

There are undoubtedly two classes of these cases : those in which good results can be obtained without operation, and those in which the results without operation would be doubtful.

It has occurred to me that we might divide fractures of the patella into two classes : those occurring in very thin subjects where separation of the fragments is not wide, and hemorrhage slight, and those occurring in fat subjects where the same conditions exist. In the former arthrotomy is not necessary. The fractured ends of the bone can be easily brought into apposition and held in place. This is best accomplished, I believe, by encasing the leg in plaster with a fenestrum at the knee sufficiently large to expose the patella. A splint moulded from gauze or blanket, V-shaped and soaked in plaster, fitted behind each fragment and held in position by a figure-of-eight bandage, I have found most effectual in keeping the bones in close apposition. Slight pressure should also be made over the seat of fracture to pre-

vent tilting. If the pre-patella tissues are found to be interposed between the fragments of bone and prevent close apposition they can be lifted by inserting a straight needle through the tissues between the fragments.

In the latter class, owing to the interposition of a mass of adipose tissue, such treatment will not insure satisfactory results, and these cases, I believe, should be operated upon when the patient's health and surrounding conditions will permit.

Where, however, the fragments are widely separated, hæmarthrosis marked, showing extensive laceration and the pre-patella tissues interpose between the fragments, I believe operative interference essential.

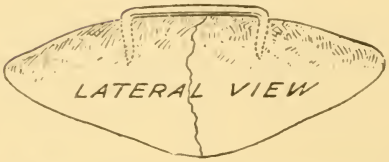
In cases not operated upon we have many obstacles to union, dependent more or less upon the extent of injury—viz., separation of fragments due to contraction of the quadriceps, tilting of fragments, rupture of the capsule, effusion of blood, intervention of pre-patella tissues, arthritis and other causes of more or less importance, all of which must be taken into consideration in the treatment of these fractures. The method of non-operative treatment which appeals most to me is that of massage introduced by Tilanus. This has one serious objection, that unless done properly will prove a failure, and how many surgeons are prepared to carry out the treatment as described? Fixation is then the method of non-operative procedure that will be adopted by the majority of surgeons. I have found the method described heretofore as practical as any. By the fixation method massage cannot be done and adhesions will form. It is in making passive motion to break up these adhesions that the great danger lies. The joint becomes anchylosed while the leg is fully extended, the adhesions form in the joint, these often giving way suddenly, and the full force exerted by the operator being suddenly thrown on the patella through the short and powerful ligamentum patellæ causes separation of the fragments at the seat of fracture. This accident I have seen occur twice very recently. I have found that as soon as the leg could

be flexed to 110° or 115° that no passive motion beyond continued use of the limb was required, and patients would gradually regain entire control of the leg. If, then, the danger lay in flexing the leg the first few times passive motion is made, to obviate this danger is important. To do this I would suggest putting the leg up in a plaster cast at an angle of 100°. This is a slight flexion of only 10°. The position is more comfortable to the patient, and in no way interferes in maintaining the fragments in proper position. At the end of four weeks the cast can be split anteriorly from the knee down, and passive motion begun by extending instead of flexing the leg, and the adhesions around the patella broken up by massage and gentle contraction of the quadriceps. This can be done every day for two weeks, at the end of which time the cast can be replaced with a lighter bandage and the patient allowed to walk around on crutches. The limited amount of motion gained in this way will increase perceptibly from day to day. An anæsthetic should never be given to break up the adhesions, as under an anæsthetic there is danger of exerting unnecessary force, frequently resulting in separating the fragments at the line of union and undoing all the good already accomplished.

If the surgeon should elect to operate the simplest method, and that requiring the least amount of manipulation, is naturally the one that should suggest itself.

The methods in vogue are not ideal, as they frequently allow separation of the fragments. This I was enabled to overcome in a recent operation by modifying the Cerclage method. The ends of a heavy silver wire were passed through the tendon of the quadriceps and the ligamentum patellæ, and brought over the top of the patella about half an inch apart; this was drawn very tightly, and by suturing the peritoneum kept the fragments in perfect apposition, resulting in bony union. The great objection to the use of wire and other sutures is that these either stretch or cut through the soft tissues. After mature consideration of the subject, the result of a number of experiments, I found that these objections

could be overcome by a very simple procedure. What is most desirous in arthrotomy for fractured patellæ is a simple, quick, and effective procedure. In testing the many methods recommended I found that as the patella was porous a nail could be driven into it without doing great damage to the bone or causing a fracture. I then determined to fasten the fragments of bone with a staple made of silver wire, and of



sufficient size to have the requisite strength. These staples were made with bevelled shanks about five-eighths of an inch in length, and bent at right angles about one-half to three-fourths of an inch apart. A small hole was drilled into the bones half the depth of the length of the shank, the fragments placed in apposition, and the staples driven into the bone in such a manner as to draw the fragments closer together.

These staples will keep the bone in perfect apposition and prevent tilting, are simple and quickly applied, requiring very little manipulation of the fragments. To do this the staples should be more widely separated in the larger fragments of bone than the smaller, which will prevent absolutely the lateral displacement of the fragments. In inserting the staples care must be taken to remove any interposing tissue; the staples are driven in with a light hammer or metal instrument until they lie snugly against the periosteum; the torn edges of the periosteum along the line of fracture are then sutured with fine silk or catgut. The skin incision is closed with interrupted sutures of silkworm-gut, and the leg put in a plaster cast at an angle of 100°. When desirable a fenestrum can be cut out of the cast over the patella region and the wound inspected. At the end of four weeks or even sooner passive motion can be made by cutting the splint and extending the leg, as already described. I feel so thoroughly convinced of the practicability of this method and the ultimate results that I have decided to suggest it, even before I can prove my conclusions, hoping others may be induced to either try the suggestions offered or improve upon the methods now existing. A close examination with the X-ray of four cases, three of which were wired and one treated by the fixation method, proved that the methods were faulty. In one case only was there any bony union. That case was one in which I employed the modified Cerclage method. In one Barker's method was employed, and in the third I could not tell, as the sutures had been removed. In the fourth the fragments were widely separated, though the function of the leg was good. I regret that the skiagraphs taken of these cases were too dim to be used, as they would have proven interesting if not valuable.

[Since writing the above I find a case reported by Dr. Thomas Kittridge, of Salem, Mass., in the *Boston Medical and Surgical Journal* of 1891, vol. cxxv. p. 544, in which he used rivets in almost the same manner as suggested by me.]

PROPHYLAXIS OF SURGICAL SHOCK.

By W. M. Perkins, M.D.,
New Orleans, La.

In the aggressive surgery of the close of the century when, under anæsthesia and with aseptic precautions, operations involving long forbidden areas and lengthened periods of time have become quite common, the prevention of the shock which so frequently complicates such cases becomes of paramount importance. Often at the beginning of an operation the patient's general condition is practically normal, and yet afterward the main source of anxiety is the collapse apparently imminent. The prolonged technique of modern asepsis and the thoroughness encouraged by an apparently satisfactory anæsthesia tend to increase the danger from this source. The importance of perfecting the prophylaxis of shock is now attracting more general attention, and the precision of pre-operative measures is constantly increasing.

Among the widely differing causes to which shock has been attributed are molecular vibration, cerebral anæmia, cardiac failure, passive abdominal hyperæmia, general vasomotor paresis, and reflex inhibition.

Crile's conclusions as to the importance of the vasomotor system in the production of shock, based as they are upon extensive laboratory research, are valuable and suggestive, especially from a prophylactic point of view. In more than one hundred cases he found that the vasomotor centres, although depressed by the same causes, were more easily affected than either the respiratory or cardiac, and that shock was most satisfactorily overcome by measures increasing vascular tension.

Cardiac failure was almost always dependent upon lowered blood pressure or impaired respiratory action, and the pulse could usually be restored when the other two difficulties could be overcome. Vasomotor failure affected the heart's action not so much by starving its muscle-fibres or its controlling ganglia, as by lessening the intravenous pressure, and thus depriving the organ of an adequate supply of fluid to act upon.

Lowered blood pressure necessarily impairs the nutrition of the vasomotor centres, increasing the vascular dilatation, and the pulse is accelerated by the effort of the heart to compensate for the diminished amount of blood ejected at each stroke. The demand of the tissues for so much nutrition per minute increases the pulse-rate through reflex stimulation. Whenever the heart's action is accelerated in its effort to restore arterial tension, or by deficient oxygenation of the blood, its controlling centres may become exhausted by over-stimulation. These cells also suffer from the toxic action of anæsthetics, and are starved when the blood is lacking in oxygen or its pressure is deficient. Heart failure may be due to inhibition or exhaustion of the cardiac centres as well as from diminished blood pressure.

The respiratory centres are affected by the same causes, but are much more liable to depression than the cardiac. When they are poorly nourished deficient oxygenation increases the shock. Diminution in the quantity and quality of the blood affects not only the respiratory central nerve-cells, but also the fibres of the essential and accessory respiratory muscles, which lose their normal contractility. Sensibility is markedly diminished when shock is once thoroughly established, and the reflexes essential to normal respiration and circulation may be lost. A vicious circle is sometimes thus established, which tends to ultimate collapse.

There is abundant experimental evidence to prove that over-stimulation of any portion of the nervous system tends both to exhaust and to inhibit the great vital centres. Crile has shown that a potent cause of such inhibition or exhaustion is manipulation of important nerve trunks in any part of the body or irritation of any portion of the vagus nerve or its

branches. He also found that the danger might be lessened by cocainizing the nerve trunk or filaments in question. (This is in line with Rosenberg's plan of cocainizing the nasal mucous membrane to prevent cardiac inhibition in the early stages of chloroform anæsthesia.) Crile found intralaryngeal manipulation especially prone to induce this inhibition. It is possible that this danger might be overcome by a rapid preliminary cocainization of the larynx through a specially devised atomizer-tip with lateral openings and suitable curves. The irritation and chilling of tissues from long exposure during operation, excessive hemorrhage, prolonged anæsthesia, rough manipulation—all these tend to produce shock.

Briefly, then, shock seems to consist essentially of a central nerve depression due to the exhaustion induced by long-continued or violent stimulation, and manifesting itself in symptoms referable to three main causes, viz.: (1) a vasomotor paralysis, (2) a respiratory paralysis, (3) a cardiac paralysis. Crile has especially insisted upon the difference between collapse and shock. The former he defines as immediate depression or death from injury or operation caused by cardiac, respiratory, hemorrhagic, and vasomotor factors; and the latter as a delayed depression or death mainly due to vasomotor failure, though any of the other factors may be of considerable importance. Inhibition is probably the most potent factor in collapse, while in shock exhaustion plays the more important part.

When the nature of the case will permit careful pre-operative prophylaxis, the liability of surgical shock may be greatly diminished. It is highly improbable that all the precautions suggested, or even a majority of them, can practically be applied to any one case, but in prophylactic as in all other treatment the personal judgment of the surgeon must determine what would be superfluous. With the treatment of shock once established it is not the purpose of this paper to treat.

Since surgical shock is produced by exhaustion of nerve centres, nothing could be more rational than to advise a period of rest prior to severe demands on those cells. Therefore, in preparing for the extraordinary strain of an operation, all

fatigue, whether mental or physical, should be avoided. The twelve hours immediately previous should always be spent in bed, and this final rest should be broken as little as possible by either transportation or preparation. With debilitated patients the necessity for these precautions is increased, and no unnecessary exertion should be permitted. It is unwise for the patient to walk to the table before a severe operation.

When practicable, the final purgative should be given at least twenty-four hours prior to operation that the final rest may not be broken by frequent evacuations. Physical rest should be as perfect as circumstances will permit. Especially should the patient be relieved of all unnecessary discussion of his own case, and no attendant should be permitted whose manner or conversation is calculated to excite the patient. It is particularly essential that the patient should feel confidence in the surgeon and should not be oppressed by fear. Since extensive preparations often excite alarm, it is advisable to make the details as simple as practicable; and it may even be better in some cases to complete them under anæsthesia, especially when pain is involved.

The patient's general condition will be greatly benefited by restful and abundant sleep for the few nights preceding the operation, and the last night's rest should be as perfect as possible. While natural sleep is far preferable, hypnotics may sometimes be useful when there is no special contraindication. The morning is preferable for severe operations, as it follows closely the night's rest, and the vitality is usually at its highest daily point. Nutrition should be promoted by several days of wholesome feeding, so planned that neither will the digestive organs be overtaxed nor the body cells be underfed. A gentle flushing of the kidneys is a good preparation for any severe operation, and the free use of water for several days at least should be urged. Where renal disease exists, mild diuretics may well be added. The important rôle of the kidneys in eliminating toxic substances from the blood renders it essential to have these organs functioning as perfectly as possible.

Bouchard, to whose valuable work we are indebted for much of the present knowledge of auto-intoxication, has urged the necessity for a preliminary abstinence from animal food in order to diminish the toxic waste products to be eliminated by the kidneys. That the skin may be as physiologically as active as possible, baths and frictions may sometimes be advantageously employed for several days. Of course, no patient should ever go on the table without at least one full bath, unless some special contraindication exists.

Besides the rest and other general measures suggested, some special means may be employed to prepare the three great nerve systems, the cardiac, the respiratory, and the vasomotor, for the extra demand to be made by anæsthetics and operation. Should there exist any cardiac or pulmonary pathological condition amenable to treatment, it should be treated as thoroughly as practicable. A course of cardiac stimulants might be advantageously employed with patients suffering from functional or organic disease of the heart. All inflammations of the respiratory tract should be relieved as completely as possible. Loose clothing and an abundant supply of pure air should be urged during the last few days. A condition of lowered vascular tone might be improved by a preliminary course of such remedies as will later be mentioned as stimulating the vasomotor centres.

In dealing with weak patients a preliminary course of alcoholics, strychnine, and digitalis may be profitably employed. Over-stimulation should be carefully avoided, but much good may be accomplished by judiciously regulated doses, when impaired circulation is poorly nourishing the nerve centres.

Binz, while supervising the moving of wounded during the Franco-Prussian War, went about with a syringe and a bottle of morphine solution. He found that patients thus treated stood transportation far better and suffered much less from shock. Nothing could be more rational than to give a hypodermatic of morphine immediately after injuries on the battlefield or elsewhere. Experimental and clinical evidence show so conclusively that pain, fear, and excitement are such potent factors in

producing the cell exhaustion which has already been pointed out as the essential cause of shock, that the morphine in such cases seems almost as clearly indicated as quinine in malaria.

It may not always have been practicable to carry out the general prophylactic measures previously discussed, but much may be done to lessen the liability of shock, even after the patient is placed upon the operating-table. In preparing to avoid shock, the question of anæsthesia will demand careful consideration. Schleich's infiltration method, Corning's nerve-trunk anæsthetization, Bier's spinal injection, and the substitution of eucaine for cocaine have all aided in enlarging the field of local anæsthesia and correspondingly eliminating one of the main causes of shock in many cases. When because of the extent of the operation, the locality, the physical condition of the patient, or for any other reason a general anæsthetic has been chosen, ether is preferable to chloroform in the absence of any renal, bronchial, or other contraindication. It has been found to be less depressing. To avoid the muscular exhaustion from struggling during the stage of excitement the anæsthesia may be begun with nitrous oxide and continued with ether. (This plan succeeded admirably in an operation for strangulated hernia in an aged female performed in New Orleans by Parham some months ago.) The narcosis should never be unnecessarily prolonged or deepened, but intermittent partial recovery should be avoided also, as excess of the vapor may easily be inhaled by the deepened respirations of this condition. The anæsthetist should be consulted before measures especially liable to make fresh demands upon the vitality of the patient are undertaken.

About twenty minutes before beginning the anæsthetic it is well to give hypodermatically morphine sulphate $\frac{1}{4}$ grain, with atropine sulphate, $\frac{1}{150}$ to $\frac{1}{60}$ grain, to which may well be added strychnine sulphate, $\frac{1}{30}$ grain. The morphine allays both pain and excitement, and renders anæsthesia easier to establish and maintain. The strychnine may be repeated during the operation when the pulse begins to flag, or in long operations, even when there has been no manifestation of exhaus-

tion. Doses of $\frac{1}{60}$ to $\frac{1}{30}$ of a grain frequently repeated are preferable to larger doses unless the threatening symptoms necessitate more vigorous stimulation. By central stimulation strychnine strengthens the heart-beat, deepens the respiration, and raises and maintains vascular tension. The atropine acts as a powerful cardiac and respiratory stimulant, and is of especial value in preventing cardiac inhibition. Tincture of digitalis may be given by needle in doses of from 5 to 25 minims when the pulse begins to be irregular or weak. It steadies, amplifies, and slows the cardiac impulse, and raises arterial tension. It must be used sparingly where the arteries may be calcareous.

Threatened respiratory failure may often be averted by stopping the anæsthetic and inverting the patient. When menacing symptoms continue in spite of hypodermatic medication and cessation of anæsthetic, the head should be lowered and the lower limbs and pelvis raised. A large quantity of venous blood is thus thrown into the thoracic veins, and the pressure in the cardiac feeders greatly increased. Besides, the intracranial circulation is facilitated. Sometimes, when unfavorable symptoms recur as the patient is returned to the horizontal position, partial inversion may have to be maintained for a long time.

Ammonia by inhalation, hypodermatically or even intravenously, is an efficient stimulant, and acts almost immediately. Alcohol, while a valuable aid in preparation and post-operative treatment of patients, is of very little value during anæsthesia, and may even deepen the narcosis. Although contraindicated in profound shock, inhalations of amyl nitrite, 5 to 10 minims, are often of inestimable value when sudden collapse threatens. When some intrinsic cardiac weakness exists, as fatty degeneration, and especially when a full pulse rapidly becomes weak, the strong probability of reflex inhibitory causes justifies the use of this powerful vasodilator, because it also powerfully opposes reflex phenomena, besides increasing the intracranial circulation. When advisedly used, its beneficial effect is too immediate to leave any room for doubt.

Saline infusion is not only a most satisfactory means of combating shock already established, but is also an efficient prophylactic agent. This is true when there has been no loss of blood as well as after severe hemorrhage. Whether the blood actually escapes from the vessels or the vessels themselves dilate, the effect on blood pressure is the same. In vasomotor paralysis the blood accumulates in the veins, which offer less resistance than the arteries, and the tissues are bled just as effectually when the blood accumulates in the abdominal veins as when it leaves the body. The value of intravenous infusion in the treatment of shock produced or accompanied by hemorrhage has been thoroughly recognized, but not for bloodless shock. In the clinics of Dr. Parham, who in an article in the *New Orleans Medical and Surgical Journal* in 1898 advocated prophylactic infusion, the writer has repeatedly observed the beneficial effects of infusion, not only for shock without hemorrhage, but also when given just before and during the more severe steps of operations in which shock was essentially feared. When the patient was weak or the operation formidable, the insertion of the canula before beginning the operation often saved valuable time when the pulse flagged. It was often left *in situ* for repeated post-operative infusions. Filling up vessels just beginning to dilate may avert disaster by reversing the "vicious circle" mentioned above, and the blood-pressure being maintained the central depression and inhibition may be more readily overcome.

The profuse perspiration which so often follows hot saline infusions may speedily remove from the vessels a not inconsiderable amount of fluid. Atropine will be of service in preventing this. The various stimulants discussed may be introduced directly into the circulation in the infusion when an especially rapid action is demanded.

Dangerous symptoms are less likely to arise when proper precautions are taken. Besides those already mentioned, all unnecessary exposure, chilling, or handling of tissues would be avoided, especially in the regions where reflex inhibitions are most likely to be started, such as the neck, axilla, and in

the abdomen, usually near the pylorus or diaphragm. The writer has seen two cases in which alarming symptoms followed manipulations of or near the pylorus. In one, a pyloroplasty, the respirations ceased entirely whenever the pylorus was lifted, to be resumed only when it was allowed to drop back.

Speed must be recognized as an essential to successful operation. Prolonged anæsthesia alone may cause death. Blunt dissection, so frequently the refuge of the timid surgeon, tends to produce shock by the tearing of nerve fibres. The importance of maintaining the temperature of the room, the patient and the solutions should never be forgotten.

Nothing that tends to diminish the dangers of severe operations can be too insignificant to command the attention of the surgeon, for each step toward a perfected prophylaxis, however small, has its intrinsic value in terms of human life.

SURGICAL ANÆSTHESIA.

By R. S. Cathcart, M.D.,
Charleston, S. C.

Much has been written on this subject, and investigation has been so thorough in regard to the various substances or agents used to produce this condition that there is nothing left for original thought except that which is forced upon us by actual experience.

Anæsthesia as applied to surgery is of two kinds: local and general. It is my purpose to confine this paper to general anæsthesia, the substances used to produce this condition the advantages claimed for each, and place myself in accord with those men who advocate chloroform as the superior anæsthetic. Of course, with the exception of cases with heart lesions, and in these it may be said that any agent or anæsthetic is most dangerous.

General anæsthesia may be defined as a state in which consciousness is suspended, the entire body relaxed, and the subject is for the time being completely at the disposal of the operator.

The signs of the condition are the loss of conjunctival reflex, a fixed, contracted pupil, slow, regular, and deep respiration, and complete loss of general reflexes and resistance. The danger symptoms of this state are cessation of respiration, stoppage of pulse, sudden pallor, dilated, fixed pupils, dark-hued blood replacing bright arterial blood, sudden cessation of bleeding in the field of operation.

Anæsthetics act by producing a paralysis of the cerebral and spinal nerve-centres. There is at first a state of cerebral

excitement followed by a state of cerebral insensibility and loss of voluntary movement, followed by a loss of reflex action. Consciousness is lost before paralysis of the muscles supervenes, and a patient is said to be fully anæsthetized when the nerve-centres are paralyzed with the exception of those presiding over respiration and circulation. There are various substances used to produce this condition—lack of judgment in making a selection among them, and the improper administration of the agent will account in many instances for the dreadful calamity of death from the anæsthetic.

Could operators always have the services of a skilled anæsthetist, whose judgment is good, founded not only on theory but experience as well, it would remove in a great measure the dread that men have for this, one of the greatest blessings to suffering humanity, and the greatest of aids to surgery.

The office of the anæsthetist is second to none at an operation, for upon him depends much of the successful termination of a case. Timidity results in an imperfect anæsthesia, and what operator has not been interrupted or harassed by this, while on the other hand an excessive use of the agent may kill the patient on the table or produce serious post-complications. It is almost criminal to intrust this responsible position to an inexperienced person or student. The profession should encourage men to become skilled anæsthetists, and those of us who live in communities that can support it could offer inducements for one to specialize in this field. His position should be placed in a true light to the laity, that they may appreciate his importance, and consequently be willing to offer him just remuneration for his valuable services. He should be thoroughly reliable, a man of ability and good judgment, and before the selection of any agent for an anæsthetic is made cases should be reviewed and patients examined with him, and upon his advice the selection based. The administration of stimulants, etc., should be left entirely to his judgment during an operation, and there should be absolutely no interference, either from the operator, other assist-

ants, or outsiders. On the other hand, the anæsthetist should give his office undivided attention, ever on the alert for danger symptoms, meeting them in a quiet manner, so as not to alarm the operator unnecessarily. If the surgeon or assistants have to direct or proffer advice to the anæsthetist, the thoughts of both for the time being are interrupted, it is confusing, and the anæsthetic is apt to be improperly administered.

Of the various substances used to produce general anæsthesia ether and chloroform are the most important, and are the only agents universally employed. The employment of the one or the other has heretofore been determined rather by national or geographical boundaries than by the special adaptability to the particular case. For example, the profession in England and in the Southern States of America by a large majority use chloroform, while ether is almost universally employed in the Northern States.

Bromide of ethyl has a most depressing effect upon the heart's action. It causes rigidity of the muscles, and its administration can only be continued for a few moments, hence it cannot be used in prolonged operations or those in which relaxation is necessary.

Ethyl-chloride. The chief field of this agent is in local anæsthesia, for, on account of its great toxic effects, and being exceedingly volatile, it is unfit for inhalation.

Nitrous oxide is only used for small operations on account of the short time that it can be administered without serious results. Men accustomed to its use can by alternating with air continue anæsthesia for some time safely. In this way major operations have been done.

Mixtures of the above substances, viz, A. C. E., Schleich's mixture, anæsthol, have been rightly met with disfavor. The idea that the good effects of one counteracts the bad effects of the other is wrong. They are composed of substances of different volatility, and consequently the method of administration determines whether the patient gets more of the one or the other. Being mixtures they cause confu-

sion in the recognition of danger signals. This being the case, and I think experiments will bear me out, it is best that we employ either one or the other of the original substances—ether or chloroform.

The advocates of ether, I dare say, are in the majority, and are supported by statistics that there is one death in about twenty-six thousand against one in ten thousand or twelve thousand with chloroform. It is impossible to get true statistics on this subject, and one should not accept them blindly. Statistics are made up principally from the reports of large hospitals. Have the thousands of cases outside all over the country been considered, and in what way are we to get at them? Have cases been followed and post-complications been recorded? The experiments of Dr. Robert Coleman Kemp will substantiate the statement that there must have been many deaths assigned to the kidneys which should have stated ether inhalation or anæsthesia as the primary factor. So, too, have the pulmonary organs been blamed when death should have been charged to ether. An expression that was used by a professor in the Medical College of the State of South Carolina, when lecturing to his class on this subject, aptly fits here: "With ether you are dealing with an unseen enemy, chloroform is an open one." Its after-effects on the organs are *nil*. We know what to be on the alert for during its administration, and afterward there is no cause for worry about pathological complications resulting.

There are many conditions that may vary the statistics. In the well-equipped institutions, with every convenience, etc., at hand for resuscitation, especially in the North, experienced anæsthetists are employed, which no one will dispute has saved many an otherwise fatal case.

Men experienced only with ether are apt to get bad results with chloroform. The whole technique of the administration of the two agents is different. It is beyond contradiction that some of the fatal cases are traceable to ignorance of the agent, failure to promptly recognize symptoms of danger, and too late to avert them; faulty preparation of the patient; need-

lessly anæsthetizing in the upright position ; lack of providing substances to combat danger symptoms, and apparatus for resuscitation.

I believe chloroform to be the best anæsthetic in all cases in which an anæsthetic can be used. In an experience of ten years I have never seen a death from its use. I have seen some nearly fatal results, but in most of them it could always be found to be due to some carelessness, timidity, lack of preparation, etc., and not to the agent itself.

Chloroform has not as many contraindications to its use as ether. It is better in old age and in children, in pulmonary troubles, atheromatous vessels, nephritis, obstetrical work, in prolonged operations about the face or mouth, where the patient cannot be kept constantly breathing the vapor, also where it is necessary to use the cautery. It is quick, the patients are not nearly as violent, the nausea is much less, hence it is better in abdominal work.

It has no post-operative complications, and the quantity of the agent used is much less. The only contraindication to its use is a diseased heart, and, as I have said, who would give any anæsthetic to a patient with heart lesions without fear? Though the effects of ether inhalations are stimulating primarily the continued or prolonged use of it also depresses the heart, and cases have been reported fatal from heart failure during the use of this agent. Some men take advantage of the first effects of ether to stimulate a weakened or depressed heart during operations where other anæsthetics are employed, giving a few inhalations of it, also in cases in which no anæsthetic has been administered, when for some reason the heart's action is feeble.

In regard to stimulants during anæsthesia, I have found, and will state it here for what it is worth, that a hypodermatic of one seventy-fifth to one one-hundredth of atropine given immediately preceding the opening of the peritoneal cavity in operations in which it has been distended, whether by fluid or growths, to be most valuable. You anticipate the consequent shock, the heart and lungs both receiving the benefit.

I have written on this subject because my daily associations with chloroform convince me that the disparity between the two agents as an anæsthetic is wrong. In normal cases, and in the hands of one skilled in its administration, chloroform is no more to be feared than ether. It is a superior anæsthetic, because it is applicable to more conditions; it produces quickly a quiet, easy anæsthesia with less distress to the patient at the time being and afterward, because there are fewer complications following its administration. When Esmarch's inhaler is used, which I consider the best means of administering chloroform, the amount necessary to produce anæsthesia and continue the condition is exceedingly small. I have seen a patient anæsthetized and kept completely so during a surgical procedure lasting over two hours, a little more than three drachms of the agent being necessary.

RETRODISLOCATION OF THE UTERUS.[1]

By R. S. Hill, M.D.,
Montgomery, Ala.

To facilitate the understanding of the etiological factors in any displacement of the uterus and to be better prepared to choose the best means for replacing and maintaining the organ in its normal position, we should know its anatomy. I will, therefore, preface my remarks on retrodeviation of the uterus by mentioning a few anatomical facts relative to the position of the organ.

The uterus is normally inclined forward, its body resting lightly on the posterior and upper surfaces of the bladder.

In regard to its supports, the intra-abdominal force is probably one, if not its chief, but for the purpose of elucidating the views I wish to present on the important or main question to be treated in this article, the surrounding bed of cellular tissue and the three pair of ligaments—anterior, posterior, and lateral—are of more importance. The anterior or round ligaments begin, one on each side from the anterior lateral borders of the uterus, just below the level of the Fallopian tubes, and pass forward, upward, and outward through the inguinal canals. They are quite lax, but serve materially in preventing the fundus from turning backward into the hollow of the sacrum to a pathological degree. They are more restraining than supporting bands. The posterior or uterosacral have practically a common origin from the posterior surface of the isthmus uteri; running backward and

[1] The terms used in this article expressive of backward dislocation refer to retroflexion and retroversion.

upward, they diverge, forming the lateral boundaries of the posterior cul-de-sac, and are inserted, one to each side of the second and third sacral vertebræ. They hold the uterus, at the point of their origin, posterior to a vertical line, drawn through its fundus. The upper portion of the uterine body is, as it were, tilted forward.

The broad ligaments pass from the uterus to the lateral surfaces of the pelvic cavity, and are more or less twisted in retroversion and retroflexion. The cellular tissue is in great abundance at the sides and in front of the uterus, but to a less extent posteriorly, forming an elastic bed for the organ laterally and for its anterior and posterior surfaces at the level of the internal os.

I am also of the opinion that the attachments of the bladder to the pelvic wall assist, indirectly, in sustaining the uterus by preventing the fundus from sagging or being forced, by intestinal pressure, downward anteriorly to an abnormal degree.

Notwithstanding the uterus in the adult being slightly anteflexed, the character of its tissue has a tendency to prohibit further flexion, hence the anterior and posterior mobility of the organ, which is necessarily considerable, not only for the proper discharge of its function, but the function of the bladder and rectum is aptly described, if I may use the expression, as normal versions.

Wherever there is as much motion as with the uterus there is a predisposition to dislocation, and from our knowledge of the anatomy of the parts we would naturally expect backward luxation of the uterine body to be, as it is, the most frequent variety of pathological displacement. All things, however, being normal I use the expression in its broadest sense. Nature's provisions, the principal ones being those mentioned, are sufficient to prevent uterine dislocation. What, then, are the departures from normal that permit retrodeviation of the uterine body to the pathological degree? The answer is, primarily, lengthening and loss of tone of the ligaments, and, secondarily, change in the structure of the organ at or

near the level of the isthmus. The upper end of the uterus cannot go into the hollow of the sacrum without the round ligaments being stretched, nor can the cervix pass forward, as it does in retroversion, which constitutes by far the majority of retrodisplacements (348 retroversions to fifty-five retroflexions, Mundé, International Medical Congress, 1881), without the length of the uterosacral ligaments being increased, and, lastly, the broad ligaments cannot be twisted, as they are in retrodisplacement, without being lengthened. In regard to the change in the structure of the uterine tissue, I am inclined to the opinion that it is invariably the result of retroflexion and not the lack of development. I do not, however, maintain that this is true when applied to anteflexion, because the condition of the anterior wall of the uterus, at or near the level of the internal os, is different from that of the posterior during the developmental stage of the organ.

This brings us to the causes of the departures from normal and the manner in which they act.

1. A general weakness shared by the pelvic structures and caused by faulty development or lack of maintenance of the physical forces. Here we have the pelvic, in common with the other tissues of the body, subnormal in point of strength.

2. Sudden tension on the ligaments, as are caused by jolts and jars.

3. The wearing of corsets or other constrictions around the abdomen, particularly before development is complete, forcing a large part of the intestines into the pelvic cavity, thereby transferring their pressure from the posterior surface of the anterior abdominal wall to the uterus.

4. Neoplasms of the uterus or other pelvic tissue adding to the task of the ligaments either by pressing against the organ or increasing its weight.

5. Subinvolution. During the growth of the pregnant uterus there is an increase in the length of its ligaments, which increase remains proportionately to the absence of perfect involution. Therefore, in these cases there is not only

an imperfectly resilient and over-heavy uterus, but abnormally relaxed ligaments. The importance of subinvolution as a cause of retrodisplacement is somewhat indicated by the statistics presented to the International Medical Congress, 1881, by Mundé, viz., 400 retrodisplacements, only five were in nulliparas.

6. Endometritis and metritis, by augmenting the weight to be sustained and impairing the resiliency of the uterine tissue.

7. Peritonitis, forming adhesions which may draw and bind the uterus in the hollow of the sacrum.

8. Inflamed appendages falling in the posterior cul-de-sac and dragging on the uterus.

9. Destruction of the tone of the posterior vaginal wall, without tearing the sphincter ani muscle, resulting in the formation of rectocele, which drags upon the uterus in the axis of the outlet of the vagina.

10. Inflammation of the cellular tissue and abnormal distention of the rectum and bladder. If atrophy of or cicatrix in the cellular tissue, in front of the uterus, drags the cervix forward, or if the rectum is frequently and abnormally distended so as to force the cervix anteriorly, the axis of the uterus will be changed and may be brought in a more or less vertical line, and then by frequent and excessive distention of the bladder the fundus may be driven backward and posterior to the vertical line, permitting the intestines, forced from the abdominal cavity, to press upon the front instead of the back surface of the uterus. Thus the strength or tone of the ligaments may be overcome by the constant tension, and the body of the organ permanently turned backward into the hollow of the sacrum. It may be said that an excessive distention of the rectum will, by more or less filling the hollow of the sacrum, prevent the fundus from occupying this position, and so it will, but after the tone of the utero-sacral ligaments is destroyed and the axis of the uterus changed its body may be forced backward during any period that the rectum is empty.

The part attributed to atrophy of or cicatrix in the cellular tissue in front of the uterus and to the rear of the bladder may be questioned. I am, however, firmly of the opinion that it not only may serve in the manner indicated, but may, by destroying the elasticity of the rear wall of the bladder, increase the necessity for abnormal distention of its upper wall, against which the upper end of the uterus rests, and thereby make more decided as well as more constant the tension on the round ligament.

We are now confronted with the question of treatment.

Though retrodeviation is an abnormal position, it does not always impair or disturb the comfort of the patient. It is impossible to even approximately determine the percentage of cases that are symptomatically manifested. Being, therefore, deprived of the only true means of estimating the importance of interference as a preventable measure, it is quite a question with me as to whether efforts should be made to correct the abnormity in the absence of symptoms. I would have no hesitancy in declaring in favor of interference were the means at our command more satisfactory.

When the condition is symptomatically manifested, that something should be done for its correction does not admit of a question.

Interference having been decided upon, either as a necessity or through expediency, our first efforts should be directed toward the removal of the etiological factors. The means for accomplishing this are more appropriately discussed under the treatment of the respective pathological conditions. I shall, therefore, leave this part of the subject untouched, except to the extent of briefly commenting on the management of adhesions and cicatricial tissue.

When the body of the uterus is fixed in an abnormal position I believe the adhesions must be thoroughly destroyed, not stretched, before the organ can be returned to and maintained in its normal position. For the destruction of the adhesions the abdominal is preferable to the vaginal route, because it exposes the tissues to view, enabling us not only

to determine with more accuracy the extent of the existing pathological condition, but to incise with thoroughness false bands that could not be reached through the vagina, or, if reached, only destroyed at an increased risk of injuring other structures; and, again, in cutting through the vagina the pair of uterosacral ligaments, whose continuity is important, will in a large percentage of cases be bisected.

When the change resulting from inflammation of the cellular tissue between the uterus and the bladder draws the cervix forward, our efforts should, primarily, be directed toward overcoming this condition. By repeatedly and forcibly carrying the cervix backward this can usually be done. It may, however, require a number of "sittings," but the advantage derived from a successful issue will be ample compensation for the time and trouble expended. Rarely, I think, will an incision in front of the cervix be required to overcome the force of the new tissue. Though numerous are the methods proposed for maintaining the uterus in its normal position, with few exceptions they are all based on the single principle of restoring the function of one or more of the ligaments.

The pessary presses on the uterosacral ligaments and adjoining tissues, and thereby draws the cervix backward and tilts the body forward. This instrument frequently serves our purpose admirably, but it is objectionable, because it is a foreign body and is not curative. I have had a few cases in which, after using the pessary for a time, the uterus remained in its normal position without artificial support. These were cases invariably due to subinvolution, and I consider the treatment applied to this condition the curative means of the retrodeviation, though the pessary was an important adjunct. Until some satisfactory way is devised for shortening the uterosacral ligaments I never expect to abandon the use of the pessary. I do not think it is indicated in retroflexion, because in this condition the fault is not in the uterosacral bands, but in the posterior uterine tissue, at the level of the isthmus, and the round ligaments. When used in retroflexion the upper bar of the pessary fits in the concavity formed by

the bending of the uterine body on the cervix, and does no good.

The operation of entering the posterior cul-de-sac and using packs to force healing by granulation has for its purpose the shortening of the uterosacral bands by causing the formation of cicatricial tissue. Pryor speaks favorably of the procedure in the absence of pus, where the body is adhered to the hollow of the sacrum. In my opinion the operation has only a limited application. In non-adherent cases it cannot take the place of the pessary, nor do I think it is an operation of election when the body is fixed in an abnormal position. Only when the cul-de-sac is opened for the purpose of drainage would I apply the method.

In 1888, Kelly undertook to shorten the uterosacral ligaments by passing a ligature from within on each side of the rectum, and then through the cervix at the level of the isthmus. This operation has not received a place in surgery.

Of the methods for shortening the round ligaments I prefer Alexander's. I have resorted to it a number of times, and have never failed to find the ligaments. I cannot, however, say that they are always present, but believe when they are absent it is an anatomical curiosity. I do not lay open the inguinal canals, and have never had a hernia as a sequel, but know that it does, in a small percentage of cases, follow the operation, because of the report of competent surgeons. It is said that occasionally the ligaments cannot be drawn out because they are adhered to the surrounding tissues by cicatricial bands, caused by past inflammation. I have never seen such an instance. In some cases the ligaments are very small and occasionally fail to sustain the uterus. This has occurred once in my practice. It is my opinion that when they give way after being shortened the fault is not so much in them as it is in our failure or inability to place on the uterosacral ligaments that part of the burden which belongs to them. If we could shorten the uterosacral ligaments as satisfactorily as we can the round, and at the time that Alexander's operation is performed, I believe we would have for the correction of

all retroversions a perfect surgical technique. In short, our defect is not in dealing with the round ligaments, but the uterosacral. Until a better method is devised for shortening the lengthened uterosacral bands, Alexander's or any other operation that shortens the round ligaments puts them in a state of constant tension, and will be followed by some failures, because the normal function of the round ligaments is not to resist constant force, and, therefore, their structure is not always adequate for such services. If I properly comprehend Alexander's operation it is not to convert the round ligaments into the principal uterine supports, but to restore their normal function of limiting the backward movements of the upper end of the uterus. While, therefore, it is, in my opinion, an ideal operation for retroflexion, it needs to be assisted in retroversion by some measure which shortens the uterosacral ligaments, thereby restoring their function. Though I have had no experience with any of the operations for shortening the round ligaments through the vagina, I do not like them, because they impress me with being radically wrong in principle. The shortening of the round ligaments in the abdominal cavity cannot take the place of Alexander's operation, for the reason that they have an element of danger that is absent in the latter, viz., opening the peritoneal cavity, and unless they increase the physical endurance of the round ligaments, which I think is doubtful, they are no better substitutes for ventrofixation than is Alexander's operation. Vaginal fixation of the uterine body deserves nothing but condemnation. When it is necessary to open the abdomen the majority of surgeons do ventrofixation. I have done the operation a number of times, but never without feeling that it was a confession of surgical imperfection. If in performing its normal function the uterus did not undergo such marked changes in size, I could find no objection to making a false band of non-elastic tissue from its fundus to the anterior abdominal wall. When, however, I recall that the top of the non-impregnated uterus does not occupy a level above the pubis, whereas pregnancy causes the fundus to rise above

the umbilicus, I am forced to the conclusion that such a band as is formed by ventrofixation will either give way during or check the progress of pregnancy. Far from perfect is any operation that interferes with the function of an organ, though it restores the organ to its normal position. There are reported instances of normal confinement after ventrofixation, followed by retention of the uterus in its normal position. In these cases it is my opinion that the false band gave way, but the physiological activity incident to the pregnancy caused a restoration of the normal uterine support. While believing ventrofixation to be unscientific and illogical in principle, I recognize, in the probable absence of something better, the advisability of resorting to it in old retroversions with adhesions, long uterosacral and small round ligaments.

In retroflexion efforts have been made to overcome the evil resulting from the change in the structure of the uterine tissue at the point of flexion, by removing a transverse plug from the opposite wall. I do not think any good is to be derived from such procedures. I had rather depend on nature restoring the tissue to normal, subsequent to the pressure being removed, by drawing the fundus forward.

VESICAL CALCULI IN CHILDREN: REPORT OF FOUR CASES UNDER FIVE YEARS OF AGE.

By Frank D. Smythe, M.D.,
Memphis, Tenn.

More than half the cases of stone in the bladder are found in patients ranging in age between fifty and sixty years. Cases of prenatal formation have been observed. Hence from this period to the end of man's time he may be called upon to travel the rocky path to the surgeon for deliverance.

Surgeons are interested chiefly in three varieties of stone, viz., uric acid, phosphatic, and the oxalate of calcium. These constitute practically all with which he will have to deal. Other varieties exist mainly as curiosities, and will not take up our time. Analysis of these infrequent varieties demonstrates that they can with propriety be classed with one of the more common forms, those elements preponderating.

Since subjects with stone are found in all countries and climates, among all races and conditions of life, we must look beyond and elsewhere for causes that operate in its evolution.

The gouty diathesis and inherited condition, constitutional, always exist with patients affected with uric-acid calculi. This diathesis, while manifesting itself at all ages, many infants and children escape, only to swell the list of more aged eligibles. Hence the disproportionate number of uric-acid stone in young subjects. The great majority of stone cases occurring in after years are of this variety.

Of nine hundred and seventy-eight cases reported by Thompson only three cases were under sixteen years of age. The condition is spoken of as one of the extremes of life—

infancy and old age. Reference to the literature at hand on the subject and inquiry among some of my surgical friends has convinced me that cases operated upon under five years of age comprise a much smaller percentage of the whole than is usually believed.

In the phosphatic cases we have observed the opposite condition. Instead of the patients being of the robust, healthy, or aldermanic type, they are usually pale, yielding, poorly-nourished, and not infrequently presenting evidence of rickets, a fact borne out by three of the four cases recently coming under my observation.

The oxalates are found among that class denominated the neurotic and dyspeptic, constituting a crowd belonging to those of gouty tendency. These are comparatively rare. We have observed that diet, unsanitary surroundings, and climate are incapable, *per se*, of rendering the bladder rocky, but are potent factors when brought to bear upon a subject the victim of either of the diatheses favoring the deposit of urinary salts.

TREATMENT. Prophylactic and surgical. Prophylaxis is here meant the institution of remedial agents and other measures capable of preventing the formation of stone. By surgical operation only the stone's removal can be effected. Hygienic and dietetic treatment is of much value in the management of patients predisposed to the formation of vesical calculi, which formation could be prevented in most cases if those susceptible were recognized early, taken in hand persistently, and intelligently treated. For the gouty patient liberal quantities of water, alkaline, preferable lithium, potassium, and sodium, with regular bathing. Diet—vegetables, milk, and fruit. Eschew meats, eggs, oysters, and similar kinds of foods. Alcoholic and malt liquors are especially harmful for this class of patients, and they should not be permitted to remain in ignorance of its consequences.

The second variety with which we meet require betterment of surroundings, out-door exercise, good clothing, suitable to temperature, above all, however, a bountiful supply of whole-

some food consisting chiefly of albuminoids and proteids. Light wines, whiskey, and brandy in suitable doses at the proper time are important aids in the management of this class of patients. The frequency with which their value are disregarded by the profession furnishes additional evidence of our fallibility.

Symptoms of stone in the bladder in children are in the main those observed in the adult, with these notable exceptions: priapism, enlargement of extra-genitals, and prolapsus recti. The former symptoms mentioned are uniformly prominent, the latter one by no means infrequent. A little patient presenting these symptoms is tantamount to the existence of stone in the bladder. Failure to find will be the exception. We are not to forget that all of the ordinary symptoms of vesical calculi observed in the adult are in children greatly aggravated.

Case I.—J. C., white, aged five years, of tubercular tendency, is reported by permission of my associate, Professor W. B. Rogers. Dr. L. Duvall, of Arkansas, referred this case to Dr. Rogers for treatment, diagnosis of stone having been made. General condition upon admission to hospital was such that operation was postponed. The child was exhausted from long suffering, high temperature, and sluggish kidneys. He was put to bed, given salol with an abundance of water, and such other treatment inaugurated as would tend to improve his general condition. A few days after entrance into the hospital the doctor was summoned to his patient, and found him in convulsions. The case was a desperate one, the condition extreme. Suprapubic cystotomy was quickly performed. A large stone extracted from purulent bladder. This child died from uræmia, in convulsions, the third day after operation.

Case II.—Stone, phosphate. W. J., white, male, aged five years. Mother died of phthisis pulmonalis. Child was always delicate. History of stone dated back three years. Referred by Dr. Gillespie, of Duck Hill, Mississippi. Diagnosis of stone had been made. He was sent to St. Joseph's

Hospital for operation. Urine was filled with pus, micturition every few minutes, tenesmus constant. The little fellow would grab his genitals and run screaming, so terrible was his agony upon attempting urination. To control him was not possible; to have restrained him by force would have been barbarous. His pulse was quick, temperature 103°, sepsis marked. Penis enormously enlarged, the size of an adult. Redundant and inflamed foreskin, the result of infection from purulent urine, aggravated by handling. Stone detected by searcher immediately upon its entrance in the bladder; also plainly felt by finger in the rectum. Bladder could not tolerate half an ounce of warm water.

Suprapubic operation was performed after proper preparation of field; incision in median line through structures to prevesical space, which was filled with foul, greenish pus. The bladder had perforated, resulting in this pericystic abscess. At this point the finger of the assistant, Dr. J. W. Thomas, was introduced into the rectum, holding the bladder well up to the abdominal opening. The bladder, which was badly diseased and very friable, was pierced with a steel hook, fixed, and opened by incision an inch or more long, as the stone was known to be of good size. Forceps were introduced, engaged the stone, which was readily removed by the practice of lateral and upward motion. This stone was embedded in the bas-fond, encroaching upon the prostate. It proved to be of the phosphatic variety, and weighed two hundred and nine grains. Bladder walls were very much thickened, of a dark color, and little resistance, purulent. It was washed clean and anchored to the abdominal incision, tube inserted and left for drainage. Patient dressed and put to bed. Second day after operation he was covered with pyæmic abscesses, though he had rested comparatively well since establishment of bladder drainage. He died.

Case III.—H. C., white, male, aged four years, of robust parentage, in good health, belonging to gouty type. History of several attacks obtained. His parents noticed that he was given to the practice of dragging on his penis and perineum,

and that he complained of pain and difficulty of urination. I found him a membrosus with priapism present, chronic, considerable tenesmus at times, at other times free and unattended with pain. Stone was suspected, which was detected by finger in the rectum, also by an improvised metallic explorer, a hair-pin. The stone was quite small and freely movable, producing trouble only when internal meatus was occluded or pressed upon. This child was not operated upon, and for the past month has remained free from trouble. He is drinking lithia water. Operation in this case will be performed during the next attack, date not fixed.

Case IV.—J. S., negro, male, aged two years. Referred by Dr. Frank A. Jones, chief of clinic, East End Dispensary, for surgical attention. Physicians are agreed that stone cases properly belong to surgeons. Child badly nourished, rickety, with prolapse of rectum to an extreme degree. Urination frequent, painful, accompanied by straining and crying. He was a membrosus, with pendulous scrotum. Diagnosis of stone was made by objective symptoms, confirmed by touch with finger in the rectum, further verified by the pathognomonic click heard when coming in contact with the searcher. Patient was operated on at the City Hospital the next day, assisted by Drs. E. M. Holder, Internes Ball and McCown. Suprapubic operation was performed; bladder held up by the finger of the assistant in the rectum; needle was introduced into the bladder with a long double thread. The bladder incised, the walls of which were found to be in a healthy condition. Forceps were introduced, and the stone removed. Bladder was closed by Lembert sutures with chromacized catgut. This suture included all but mucous membrane; operation completed by closing the abdominal incision in the usual manner. Patient was placed in bed in charge of a nurse. He urinated after several hours involuntarily, henceforth he passed his urine normally at regular intervals. Catheter was not retained, nor was it necessary to draw his urine at any time after the operation. The only trouble we experienced was combating his mania for food and drink.

Beer, cabbage, and sugar were the coveted articles. To Interne McCown I am indebted for the notes of this case. This is the youngest case subjected to suprapubic lithotomy that has come within my knowledge. Dr. W. D. Sumpter, of Nashville, Tenn., reports a case in the September issue of the *Memphis Medical Monthly*, three years of age. Recovery.

I trust that the discussion will enable us to determine the best method of dealing with these cases. The essayist is very partial to the suprapubic route.

SUMMARY. 1. That stone is neither climatic nor dietetic in origin, but under favorable conditions they are factors in its development.

2. That it occurs at all ages, increasing with each decade up to fifty, gradually.

3. The majority of cases occur between fifty and seventy years of age; overeating, lack of exercise, failure to eliminate products of waste are active causes.

4. That the negro race furnishes a larger percentage of cases of stone than it has heretofore been accredited with.

5. From our experience we are of the opinion that the uric acid varieties do not predominate in children to the extent one would infer from the literature on the subject.

6. That the same symptoms are greatly aggravated in children, and that the enlargement of extra-genitals, priapism, and prolapsus recti are peculiarly suggestive of the presence of stone, and should always ensure thorough examination for the same.

7. The value of rectal and bimanual examination cannot too strongly be urged in conducting examinations of children for stone. The diagnostic value of the searcher is well known.

8. The rectal bag is not only unnecessary in operating upon children, but it is a hinderance and not without its dangers.

9. Bladder when badly diseased should be left open for drainage and rest.

10. Bladder walls that are healthy should be closed by Lembert suture, material animal, and dropped back into the cavity with no provision for drainage.

11. The treatment is essentially surgical, suprapubic operation the ideal one. The modern method of its performance and the success attending it bids fair to shelve the useful and heretofore very popular procedure—litholapaxy.

12. The retention of a catheter in children is found to be wholly unnecessary while it adds much to the patient's discomfort, increasing the difficulties of promoting quietude.

13. Females are almost exempt from bladder stone, due to position, patulency, and dilatability of the urethra.

EXCISION OF THE SHOULDER-JOINT.

By A. R. Shands, M.D.,
Washington, D. C.

The rarest of all joints that the surgeon is called upon to treat is the shoulder-joint. Especially is this the case as regards tuberculous disease. Dr. James K. Young, of the University of Pennsylvania, reports that in 2292 cases of orthopædic affections treated in the Orthopædic Department of the Hospital of the University of Pennsylvania there were only two cases of this affection. The present writer, having become especially interested in the subject of excision of the shoulder, on account of the rare case herein to be reported somewhat in detail, has looked up the literature on the subject so far as possible, and has been able to find the report of but very few cases. The text-books dispose of the subject in a very few words; all, however, agree that excision for relief of extensive osteitis of the head of the humerus is fully justified by the excellent results obtained functionally as well as the complete cure of the disease.

Excision of the shoulder should never be done as a routine practice, as a natural cure under a conservative treatment is the most desirable; for even with an absolutely ankylosed joint the patient has an exceedingly useful arm, chiefly on account of the free motion of the scapula, to which the head of the humerus may be firmly attached by bony union. In either case in the vast majority of cases almost every motion can be effected except an overhead one, since the arm cannot be raised above the shoulder.

Excision of the shoulder in gunshot injuries is now well recognized as an operation of great value, a fact well demonstrated in our recent wars. In gunshot injuries there is seldom any necessity for the removal of more than the head of the humerus; the same is true in ununited fractures of the neck of the humerus as well as in disease, for it is extremely rare that more than the head of the bone is involved in an osteitis. The writer has been unable to find the report of any case of excision of the shoulder in which more than the head and neck has been removed. This fact is especially interesting in connection with the case here reported, in which seven and one-half inches of the humerus, with the head, had to be excised to remove all of the diseased bone, leaving the patient a very useful arm. Regarding the technique of excision of the shoulder, the writer will quote from Bradford and Lovett's excellent book on orthopædic surgery, as follows:

"The longitudinal incision is in general the most useful. The periosteum is divided with a bone knife inserted along the inner border of the bicipital groove. The arm is rotated both outward and inward, and the periosteum and muscular attachments are removed as they appear. The head can be removed with the keyhole or chain saw, removing as much of the bone as is diseased. The operation is performed subperiosteally, and the head of the bone is thrown out of the wound and sawed off. In after-treatment very good fixation can be obtained by bandaging the arm to the side with a thick pad between the body and the inner side of the arm. Plaster-of-Paris dressing around the chest and arm affords the best fixation; and after the need of complete fixation is passed a sling answers every purpose. Passive motion should be begun as soon after the operation as possible, if it is desired to obtain a movable joint; but the surgeon in that way runs the risk of making a flail-joint, inasmuch as but little of the ligamentous structure has been preserved. Ankylosis of the shoulder is of comparatively slight importance in comparison to obtaining a stable joint, on account of the mobility which the shoulder-blade possesses, so that passive motion should

not be begun too early, and in many cases should not be undertaken at all."

Miss R., aged thirty years. Personal history good, with the exception of the trouble with the left shoulder. Patient is a well-developed young woman, five feet five inches tall, and usually weighs about one hundred and twenty pounds, and is of a decided brunette type. She has always been strong and hearty, with the exception above noted. She is one of a large family, nine children, the youngest nine years old, all healthy except one sister, who died recently of consumption at the age of thirty-two years. Father and mother are living and enjoying good health. At the age of five years the patient received a severe injury in the left shoulder, which, in a few days following the injury, began to swell and soon developed a purulent synovitis. A large quantity of pus was evacuated from the joint, suppuration with a profuse discharge continued for several years, but finally ceased, and all sinuses closed. When between eight and nine years old abscesses began to form one after another over the shoulder, in the axilla, and along the anterior aspect of the arm to within a few inches of the elbow. Sinuses at the seat of these abscesses continued to discharge for several years. Then for about nine years the sinuses remained closed, but during this period the patient says she was never free from pain. At the end of this time another crop of abscesses began to appear, which were incised one after another, leaving discharging sinuses which existed at the time she came under my charge in January, 1899. During this period of twenty-five years this patient had received the most conservative treatment, the abscesses being simply incised as they appeared. Many small pieces of necrotic bone came away. Upon examination I found the general condition of the patient good, all of the vital organs being in normal condition. There were six or eight sinuses situated chiefly on the anterior aspect of the shoulder and arm, extending nearly to the elbow-joint, all discharging a thick, creamy, foul-smelling pus. Dead bone was detected with the probe at the bottom of each sinus.

Operative measures were advised and accepted. On January 18, 1899, a free longitudinal incision was made about three inches long, and an attempt was made with chisel and curette to remove the dead bone; but before proceeding very far there was discovered a large sequestrum enveloped in newly-formed bone with numerous sinuses extending through it. The diseased bone was so extensive that it was impossible to remove it all without doing an excision, and as this radical procedure had not been anticipated or advised it was postponed to gain the consent of the patient.

Consent having been obtained to do whatever I thought best, on April 19th I excised seven and one-half inches of the humerus through a longitudinal incision extending from the acromion process about nine inches down the anterior aspect of the humerus. All of the periosteum was dissected back from the humerus, which was sawed off seven and one-half inches from the glenoid cavity and about one-quarter inch below the lowest bony sinus, which is shown in photograph No. 1.

The structure through which the long incision was made consisted of a mass of cicatricial and fibrous tissues, all of the muscular fibres having degenerated as a result of this old inflammatory and suppurative process. The head of the humerus was thoroughly diseased and firmly ankylosed with the glenoid cavity. After disarticulating the head of the bone the glenoid cavity was thoroughly curetted, which removed all of the diseased bone. The hemorrhage was profuse; many ligatures and hot water were freely used. A counter drainage was made in the axilla and a drainage-tube was inserted. The long anterior incision was closed with interrupted sutures of silkworm-gut after inserting a drainage-tube extending the entire length of the wound, with free openings at either end. The wound healed firmly in about four weeks, and has remained so up to the present time, about nine months. After applying antiseptic dressings the arm was bandaged firmly to the side and held in a fixed position by means of plaster-of-Paris bandages. There was little or

Fig. 1.

Fig. 2.

no shock following the operation, and the patient made a rapid and uneventful recovery.

The tissues above the proximal end of the humerus have contracted several inches ; considerable bone has formed from the periosteum, which was left in ; this has stiffened the arm considerably and gives the patient a very useful arm.

Photograph No. 2 shows a sequestrum of bone surrounded by a reparative shell of bone newly formed from the uninjured periosteum. The sequestrum evidently represents the result of the original disease in the shaft of the humerus twenty-five years ago.

JACKSONIAN EPILEPSY DUE TO UNRELIEVED DEPRESSED FRACTURE OF THE SKULL.

Report of Two Cases.

By L. Burthe, M.D.,
New Orleans, La.

Many operations have been performed, both empirically and with indications, for the relief and cure of epilepsy in all its forms. The practice of operating somewhere about the body, in hope of relieving this condition, has gradually and forever disappeared. It is only when by positive clinical symptoms we can locate the cause of cerebral irritation that we are justified in resorting to surgery.

Syphilis and the neoplasms to which it frequently gives rise in the brain and its coverings, and traumatism, are perhaps the most common causes of partial or Jacksonian epilepsy.

The two cases I report are of Jacksonian epilepsy due to traumatism.

Case I.—N. D., aged twenty-five years, colored, male, a native of Louisiana, and a laborer, was admitted to the Charity Hospital on August 4, 1896, to the service of which I was then interne.

His family history was good, none of its members having suffered from convulsions of any description.

Personal History. Had had malaria three or four years previously; no venereal disease excepting gonorrhœa.

Patient applied to the hospital for relief of frequent epileptic seizures occurring two and three times a day. The first convulsive movement occurred one year previous to his

admission, and, since the beginning, from one or two a month to two and three a day. He was suffering incessantly from headache.

After careful inquiry he recalled having been struck on the head with a spade, which had rendered him unconscious, and caused what was thought at the time to be only a lacerated wound of the scalp.

It was following this injury that he began suffering with severe headaches, how long after the patient was unable to say, but while suffering intensely with headache his first convulsion occurred.

Objective Symptoms. On examination of the head a marked depression about a half-inch in diameter was found a little in front of the fissure of Rolando and an inch to the left of sagittal suture.

The convulsive movements began in the thumb and fingers of the right hand, increasing to the muscles of the forearm, becoming more general until the patient was overwhelmed by a general epileptic seizure. No initial cry, but total loss of consciousness.

These symptoms corresponded exactly to those due to pressure at the point of depression. This led to the diagnosis of Jacksonian epilepsy due to depressed fracture of the skull.

The case was operated on August 8, 1896, by Dr. Delaup, visiting surgeon. Head was shaved and prepared in the usual manner. Chloroform anæsthesia.

A semicircular flat incision was made, curved upward and flat, reflected down so as to expose the seat of fracture. The trephine was applied over the depression, so as to remove the depressed piece of bone. This bone showed signs of necrosis.

There were very strong adhesions formed which had to be torn in order to remove the depressed plate. On its removal a fluctuating mass bulged through the opening in the cranium. An aspirating needle was inserted and thick pus found, which was drained by a free incision, and cavity packed with gauze.

An interesting condition in this case was that for several days when the wound was dressed and packed even lightly the patient had a typical convulsion; then the pack seemed to cause no more irritation.

An opening in the centre of the flat was made to admit of free access to the abscess cavity; this healed by granulation. The line of incision was brought into apposition by silk-worm-gut sutures; this healed without any trouble.

After the operation the number of convulsions diminished rapidly. Patient made an uneventful recovery and was discharged September 3, 1896.

In 1897, I again saw the case, and since his dismissal he had had no convulsions.

Case II.—A. C., laborer, aged twenty years, colored, male, native of Mississippi.

Admitted to the Charity Hospital on March 23, 1897, suffering with very frequent attacks of epileptic convulsions, beginning in the right arm and leg, which rapidly became general, causing unconsciousness. He had several convulsions every twenty-four hours. This patient had premonitory symptoms which enabled him to foretell an attack by a few minutes.

This man gave no history of hereditary epilepsy, nor of acquired syphilis, nor could I detect any of hereditary syphilis. These convulsions had appeared only two months before his admission into the hospital. On being asked if he had received any severe blow about the head, he told of having been struck on the head with a blunt instrument by some highwaymen. He was stunned, as he expressed it, and robbed. This had occurred four months or thereabouts before he came to the hospital.

On the head, situated over the upper third of the fissure of Rolando, on the left side, was a distinct depression.

With the symptoms present and the situation of depression an operation was advised.

On March 29th I operated on the case; in the interval between his admission and the operation potassium bromide was given in doses of fifteen grains four times daily.

Patient prepared in usual way. Chloroform used as the anæsthetic.

A horseshoe incision, curved upward, was made, flap reflected down, and depressed bone exposed. The skull was trephined over the depression, so as to remove the piece of bone causing pressure. This was done without difficulty, as there were no adhesions. A small nick, which had been made in the dura by the trephine, was closed with a catgut suture, skin brought together with silkworm-gut; no pack.

On the second day the patient developed an acute meningitis, which caused a great deal of anxiety; no pus formed anywhere, however, and with the use of the ice-bag and potassium bromide the case recovered.

Discharged from hospital May 17, 1897.

This case I heard from, indirectly, several months later; he had never had another convulsion.

TWO CASES OF ŒSOPHAGEAL DIVERTICULUM.

With Remarks.

By Maurice H. Richardson, M.D.,
Boston, Mass.

Case I.—I first saw H. M. H., Esq., a gentleman, aged fifty-three years, on November 24, 1893, in consultation with Dr. F. I. Knight. He had been referred to us by Dr. E. F. Cushing, of Cleveland, Ohio. Mr. H. had suffered from malaria and digestive disturbances since service in the United States Navy during the Civil War. The family and personal history was good. In June, 1890, he had some pharyngeal trouble, accompanied by "hemming" and clearing of the throat. For some six or eight months he had some difficulty in swallowing solids. Dr. Knight found at this time that the pharynx was brown and cicatrized. There was little if any resistance to the passage of a bougie of considerable size. Dr. Knight thought that the symptoms might be owing to the condition of the lower pharynx. About a year after this time Dr. Bosworth discovered an œsophageal pouch.

Dr. Cushing, in a letter to Dr. Knight in 1893, wrote: "Mr. H. has an œsophageal diverticulum of uncertain age. It has caused symptoms for about four years. About three years ago Dr. Bosworth discovered its existence, and since then Mr. H. has been under my observation. It is in the left side of the neck, with its orifice at about the level of the cricoid cartilage. It fills with the first food swallowed at a meal, but the distended pouch does not further interfere with

deglutition. The pouch can be partly emptied soon after eating by a voluntary muscular effort. It can then be swabbed clean by the patient with a cotton-tipped bougie. In the past three years the diverticulum has increased in depth about one-half, and perhaps doubled its capacity. It will now hold about one ounce. I have advised, whenever the question of operation comes up, that it should be discussed by you and Dr. Richardson. For the past six months there has been no treatment except to keep it clean. Before that time a large-sized bougie was passed, in the hope of obliterating the sac, but without effect. Of late it has been impossible to get any bougie past the sac. The history of progressive interference with deglutition makes me think that the question of operation ought to be thoroughly discussed."

Mr. H. himself stated that there had never been any injury to the throat. "The first raw oyster will lodge in the sac; the second will go down. The difficulty in passing the bougie is that it will go right into the sac. Dr. Cushing used to pass the bougie himself. After a week or two I learned to pass it; but for some reason I stopped it, and did not use the bougie for some little time. When I attempted to use it again I could not pass it. There is no pain except when I try to pass the bougie. There has been some loss of flesh, but not very much—perhaps ten pounds."

The general condition of the patient was excellent. In passing the olive-tipped probang an obstruction was met nine and one-quarter inches from the upper incisors. I could not make out exactly the opening into the œsophagus, but thought it to be at the junction of the œsophagus with the pharynx and a little to the left. The fundus of the sac would be, in a man of the patient's height, a little below the level of the clavicle. No tumor could be felt, even when the sac was distended with food. The olive-tipped probang could not be felt, except as it was passed up and down. When at the bottom of the pouch the olive-tip could not be felt, and while passing there was no way of telling whether it was in the œsophagus or in the pouch.

The patient stated that he had learned the art of swallowing without choking, and yet, at times, in spite of every care, he had been obliged suddenly to leave the table on account of violent choking sensations. In swallowing liquids he first took a single small mouthful. After that he could swallow anything. If he tried to take several mouthfuls first he would choke, the obstruction probably interfering with the œsophageal muscles.

After a careful consideration of the case it was decided that an operation for the removal of the diverticulum ought to be performed in the near future. My opinion was embodied in a letter to Dr. Cushing as follows:

"DECEMBER 12, 1893.

"This lesion does not as yet seem to cause him serious inconvenience or disability. At least, he states that if it is not going to be any worse he can get along very well. The tendency of these œsophageal diverticula is, of course, to get worse, and, from decomposing food or from some other cause, to set up serious trouble. I see no reason why an external œsophagotomy should not be performed and the diverticulum removed. I should try—if at the close of the operation there seems to be no objection—the immediate suture of the œsophagus. The external wound ought, I think, to be loosely packed with gauze for a day or two before it is allowed to close. I dare say that the time will come when we shall close the œsophagus and the neck immediately after these operations; but there is so much danger of infecting the wound when the œsophagus is opened that I should not think this a safe procedure at present."

I did not see Mr. H. again until May 26, 1898. In the meantime he had consulted many prominent surgeons abroad. He was advised by Butlin to have the diverticulum removed. Butlin refers to his case in the *British Medical Journal*, 1898, vol. i. p. 8, as follows:

"CASE VI.—A gentleman, aged fifty-seven years, staying in London, was brought to me by his doctor, Dr. Edward F. Cushing (Cleveland, Ohio), on July 15, 1897, for my

opinion on the desirability of removing a pressure pouch from his œsophagus. In the year 1891 he began to experience annoyance from the return of fragments of food from time to time. The difficulty has slowly grown greater, but he had not become thinner, and his health was excellent. He was able to demonstrate with ease a pouch in the usual place, for he was a very intelligent man, and had studied the whole subject of œsophageal pouches with great attention. He could press water which he had just swallowed out of the pouch, or, rather, empty it out by leaning forward; could pass an instrument into the pouch (a distance of about nine inches from the teeth), and could press solid materials out of the pouch. But there was no obvious bulging of the neck after swallowing.

"I believe this gentleman has made up his mind to have the pouch removed, if he has not already undergone the operation.

"I saw Mr. H. for the second time on May 26, 1898, as I have said before. Since 1893 the symptoms had remained, on the whole, the same. There had been some increase in the dysphagia, and choking at the table had been more troublesome, so that he had been obliged to avoid public dining-rooms and to give up social dinners. He had become very skilful in keeping the pouch dry and clean. His general health had not suffered seriously.

"I was able to pass the probang into the pouch without difficulty; in fact, it was impossible to get by it. No evidence as to the breadth of the diverticulum could be obtained by physical examination. No tumor could be felt, whether the pouch was empty or full. There was no way of telling whether it was situated more to one side of the median line than to the other. The path taken by the probang was precisely that of the normal œsophagus.

"The history and physical signs clearly warranted the diagnosis of pulsion diverticulum.

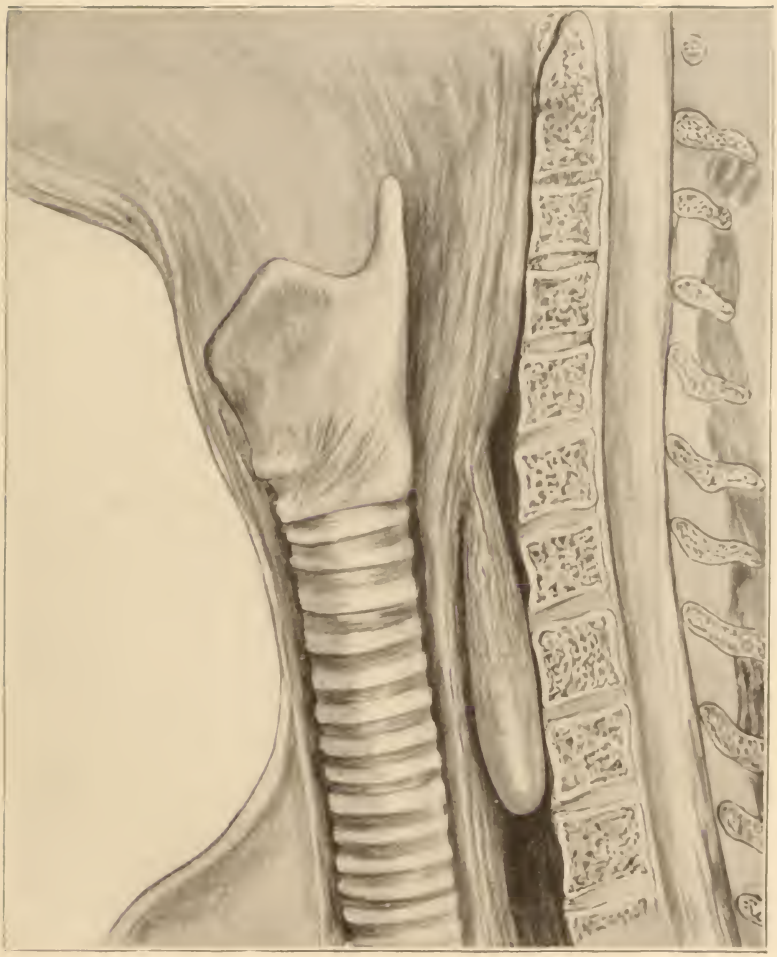
"It was probable, from the absence of local inflammation, that the pouch was non-adherent, and that, like the œsoph-

agus itself, it would be found loosely connected with the deep structures of the neck and posterior mediastinum.

"The dangers to be anticipated from excision were those of sepsis. Because of the impossibility of sterilizing the pouch the patient could hardly escape a slight wound infection. He would run the danger also of those deep cervical phlegmons which are occasionally seen after external œsophagotomies for the removal of foreign bodies. Unlike cases of impacted foreign bodies, however, in many of which the peri-œsophageal infections are at the time of intervention already under way, the present case presented no mucous abrasions, no infected areas. There was only the danger of wound infection at a time when there would be every opportunity for cleansing and for disinfection. The danger of infection was, moreover, slight, for the patient had kept the pouch clean by frequent wiping—there had been no putrefaction of retained food. The only source of wound contamination would be a normal œsophagus and a well-cleansed diverticulum. As well as could be determined by similar cases, the course of this lesion, left to itself, would be progressive. As a result of the gradual dilatation of the pouch, the patient would suffer from a constantly increasing dysphagia. Moreover, there would always be the possibility of local phlegmons and general septicæmia. The dysphagia itself might become excessive, and require gastrostomy. Finally, with advancing years, the dangers from surgical intervention would be greatly augmented, for not only would the pouch be larger and in relation with deeper and more important structures, but it might, by inflammation, be adherent to them. Moreover, to the increased difficulties of the operation would be added the dangers of enfeebled powers of resistance. An operation was therefore recommended.

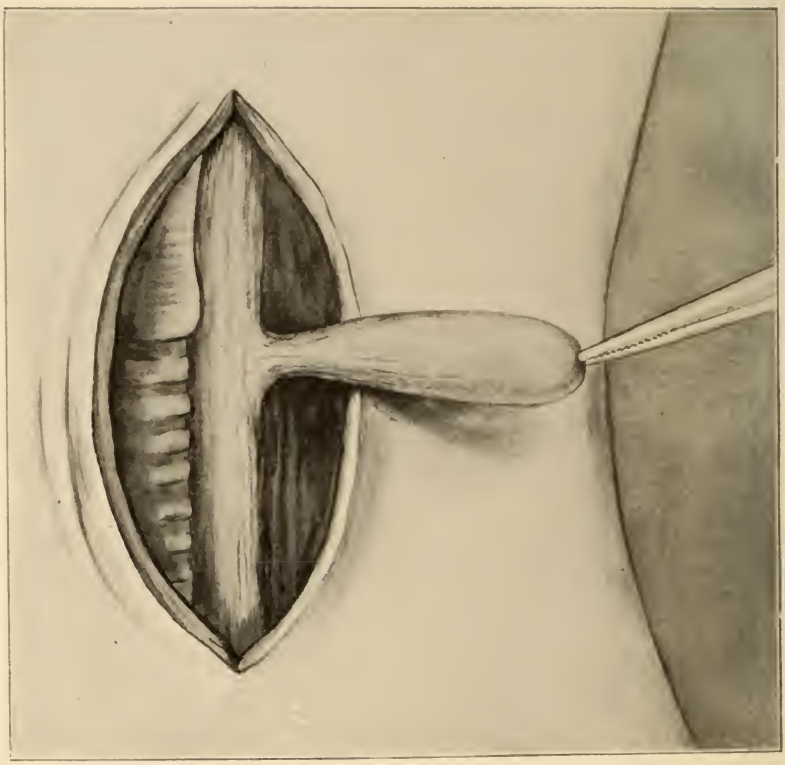
"An operation was performed at St. Margaret's Hospital on June 1, 1898. I was assisted by Drs. Brewster and Jones, and by Miss Durling. Ether was given by Dr. Cushing, of Cleveland. Dr. Brewer, of New York, and Dr. J. C. Munro, of Boston, were present.

FIG. 1



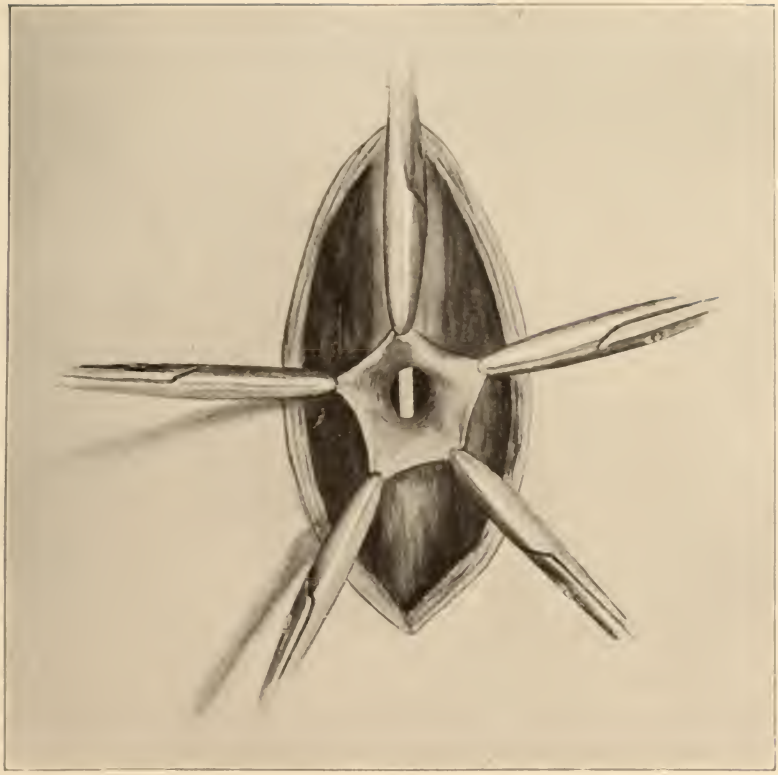
Situation, shape, length, and depth of the diverticulum when first exposed by dissection. Case I.

Fig. 2.



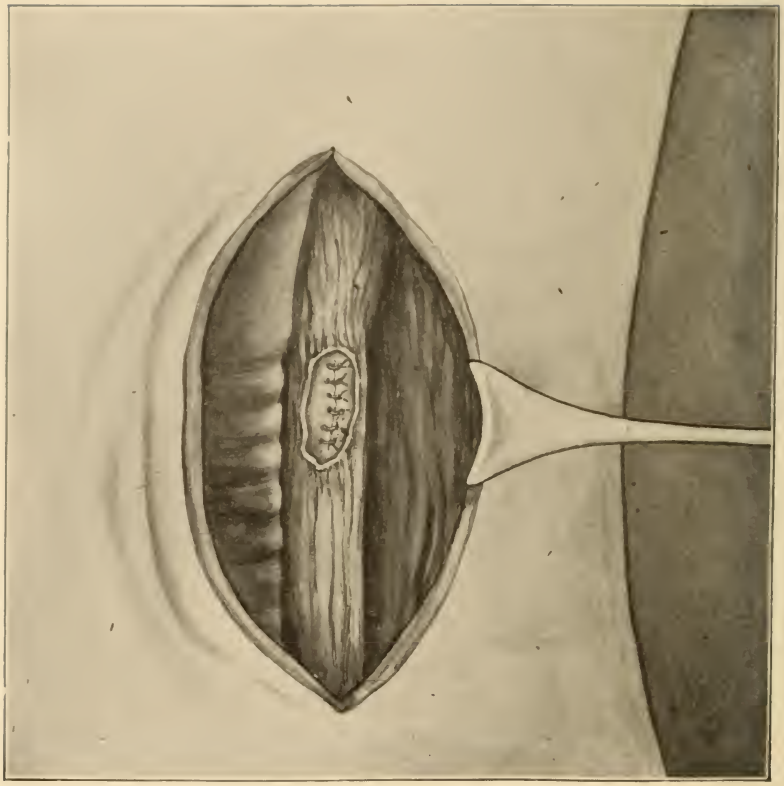
Diverticulum freed from its attachments and delivered from the wound. Case I.

Fig. 3.



Isthmus of diverticulum after excision of its main portion. The cut margin is grasped by pressure-forceps In the œsophageal opening the stem of the probang is visible. Case I.

Fig. 4.



Shows the mucous lining of the base of the sac inverted and united by interrupted Lembert sutures of catgut. Case I.

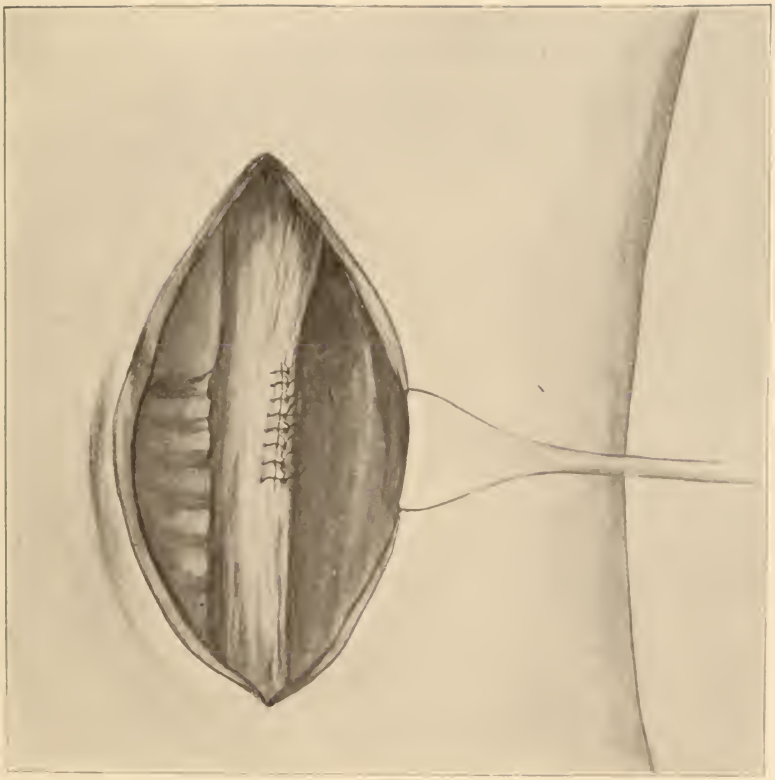
"To keep the mouth and throat dry, atropia was given hypodermatically before etherization. This plan worked admirably. The œsophagus was exposed by a cut about four inches in length along the anterior border of the sternocleidomastoid. To get a clear view of the field the anterior belly of the omohyoid was cut. Especial care was taken to avoid the recurrent laryngeal nerve and the thoracic duct. The great vessels at the base of the neck stood out prominently at the lower angle of the dissection, which was throughout so dry as not to require the application of a single ligature. At first no pouch could be detected. Careful exploration with the blunt dissector between the œsophagus and the vertebræ, however, finally revealed it. It was situated behind the œsophagus, and extended downward nearly to the aortic arch. (Fig. 1.) The presenting surface was grasped with forceps and drawn to the left. The attachments of the pouch were, as anticipated, loose, and the sac, easily separated with blunt instruments, yielded to moderate traction until the whole pouch was delivered and projected from the wound at right angles with the œsophagus, to which it remained attached by only its base. (Fig. 2.) Even at this time it was difficult to make out exactly the opening of the pouch and its relations with the œsophagus. Dr. Brewer, therefore, passed a probang into the pharynx, beyond which it was easy, with the finger in the wound, to deflect it by the opening of the pouch. The fundus of the pouch was next opened, and the edges of the opening were grasped with hæmostatic forceps. (Fig. 3.) By applying four or five forceps and by spreading this opening we could determine the exact extent of the interior of the pouch, the size of its mouth, its relation to the pharynx and œsophagus. The base of the pouch was at the very beginning of the œsophagus, in its posterior wall. The upper margin of the opening was contiguous to the pharynx, if not actually between the fibres of the lower constrictor. The walls of the pouch were thick at the base. Toward the fundus they became gradually thinned. The pouch seemed to be a prolongation of the mucous membrane be-

tween and through the muscular fibres of the pharynx and œsophagus. At the fundus its walls were translucent—almost transparent. The base was thickened and seemed to be grasped between longitudinal muscular fibres. These longitudinal fibres could be seen passing up and around the isthmus of the diverticulum, gradually being merged and lost in the translucent portion. About the constricted base, and continuous with the œsophagus, were numerous veins circularly arranged, from which were given off toward the diverticulum many small branches. The interior of the diverticulum was perfectly smooth. The tip of the index finger could be thrust into the œsophagus through the circular base of the pouch, which was just about large enough to admit it. The pouch was removed by cutting through its isthmus close to the pharyngeal opening. The mucous membrane was inverted into the œsophagus and fastened together by a few interrupted fine catgut sutures. (Fig. 4.) The other layers were also inverted and fastened by interrupted Lembert stitches of silk. (Fig. 5.) The external wound was closed, except at the centre, where a space was left, through which a small piece of sterile gauze led to the line of sutures in the œsophagus.

"The patient bore the operation extremely well. The temperature was practically normal after the operation, though on the third day it reached 100.6°. The pulse was never above 100. The greatest discomfort was from the expectoration of mucus, and the greatest pain from swallowing. The difficulty in swallowing gradually disappeared. The packing was removed on the fourth day. The stitches were out on the seventh day. The wound was entirely healed on the tenth day. The patient has been perfectly well ever since. There has been no difficulty in swallowing and no discomfort whatever."

Mrs. D. W. M., aged fifty-four years, came to me April 25, 1899, complaining of great difficulty in swallowing. Small pieces of solid food would remain in her throat and be

Fig. 5.



Shows the external layers of the œsophagus closed by interrupted Lembert sutures of silk. Case I.

regurgitated even as late as twenty-four hours after deglutition. The only throat disease that she ever had was diphtheria twenty-five years ago. "As soon as I begin to eat this place in my throat fills with liquid and food. What nourishment I get is what passes by after it is full. It is a great burden. I can eat hardly anything except bread. I cannot eat potatoes or meat of any kind. Sometimes it is hours before I throw up what I have eaten."

The symptoms began at the menopause. The first indication that she remembered was that it "tired her to swallow." She would have to try hard to get food by a certain place in the throat. It was particularly difficult to swallow medicines, and she would have to take them in milk. The first thing that she found she could not swallow were oysters. Pills would lodge and be regurgitated, and so would beans. There was a loss of nine pounds during the winter, her weight falling from one hundred and two to ninety-three pounds.

Passage of the olive-tipped probang was arrested seven inches from the upper incisor teeth. It was easy to pass the probang thus far, but impossible to pass it further. No tumor could be detected in the neck. There was no pain nor tenderness expressed during the manipulations of this examination. The patient was emaciated, but of good color and strength. The heart, lungs, and kidneys were healthy.

The diagnosis in this case seemed reasonably certain, though not as positive as in the preceding one. The regurgitation of food was a less marked, perhaps a less well observed symptom. The persistent and invariable filling up of the sac before food could pass was not so prominent a feature, though it undoubtedly occurred as often as food was taken.

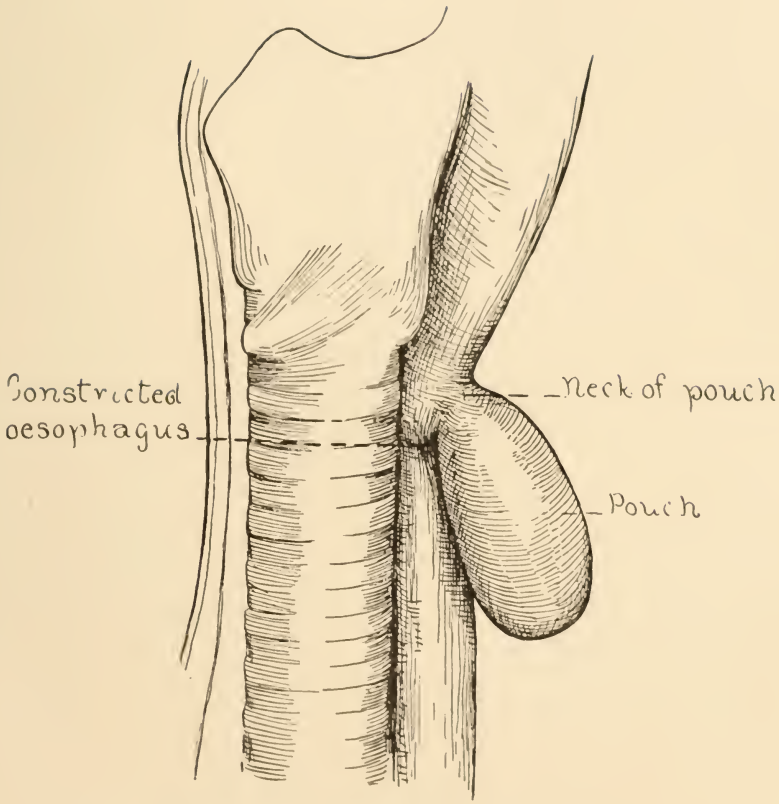
The question of organic stricture arose in the consideration of operative treatment. It could not be positively asserted that the obstruction was due to a pouch. On the other hand, the duration of the symptoms seemed to rule out obstructions of malignant origin. A benign stricture of the œsophagus, with dilatation just above the plane of constriction, would explain all the symptoms.

Gastrostomy was considered, as was also inversion of the pouch and suture according to Girard's method —an operation which will be described later. This operation was, however, deemed impossible, as it was apparent that, even if inversion could be successfully accomplished, the lumen of the œsophagus would undoubtedly be practically closed. Excision of the pouch and suture were therefore decided upon, and on May 11, 1899, the operation was performed.

The œsophagus was readily found by a dissection of the neck through an incision five inches in length along the anterior border of the left sternocleidomastoid muscle. No important structure was divided except the anterior belly of the omohyoid muscle. A pouch was discovered behind the upper portion of the œsophagus. The base of the pouch was attached at the posterior surface of the very beginning of the œsophagus and the lower border of the pharynx. (Figs. 6 and 7.) The fundus of the pouch was easily separated from the prevertebral space, and withdrawn from the wound at a right angle with the œsophagus. The pouch was opened and explored, as in the preceding case. With the finger in the pouch, the probang, introduced through the mouth, could be guided into the œsophagus. The index finger was next passed carefully through the neck of the pouch into the œsophagus. A constriction lined with friable mucous membrane was here found. Passage of the finger through this constricted portion resulted in a longitudinal tear, which seemed to evolve the greater part of the lining. The probang, after being passed by this constriction, could at one time be introduced into the stomach ; at another it could not. It seemed at the time to meet with an obstruction lower down. The parts were repeatedly examined to determine the exact shape, size, and position of the pouch and its relations with the œsophagus and pharynx.

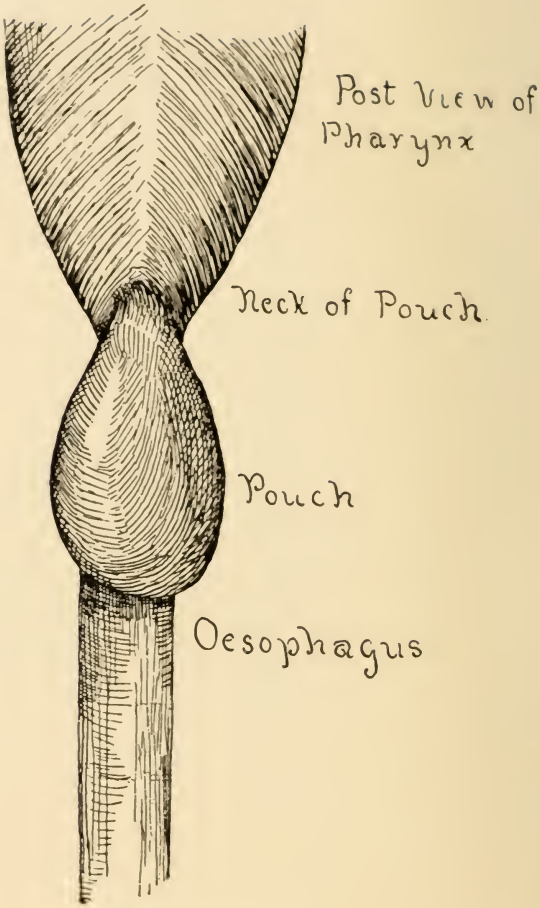
The pouch was smaller than that in the preceding case. It was about the size of half a hen's egg. The opening into the œsophagus was sufficient to admit easily the tip of the index finger. The œsophagus just below the opening of the

FIG. 6.



Situation, shape, and size of diverticulum in Case II.

FIG. 7.



Same; posterior view. Case II.

pouch had the diameter of a lead-pencil. Externally the œsophagus, from the diverticulum to a point as far as the dissection extended, was perfectly normal.

Although the mucous membrane of the œsophagus seemed normal, yet it was not, for it gave way under the gentlest pressure of the finger. There was a constriction at that plane, caused either by real pathological changes in the œsophagus or by disuse. The tear in the œsophagus was converted into a longitudinal slit by extending the incision downward in the posterior wall through the lower border of the isthmus of the sac, and through the constricted œsophagus. (Figs. 8 and 9.)

Fearing the formation of a permanent organic constriction at the site of the laceration, a portion of the pouch was utilized to enlarge the diameter of the contracted œsophagus. To accomplish this end a considerable circular margin was left about the opening of the sac. (Fig. 8.) The lower portion of the margin was brought downward and placed in the gap made by the divided posterior surface of the narrowed œsophagus. (Fig. 9.)

The effect of this procedure was to increase the lumen of the œsophagus by a small area of tissue taken from the pouch. The transposed tissues were taken, to be sure, from an abnormal sac, yet it was desirable that this tissue should be thin and elastic, rather than thick and rigid. The subsequent effect of this plastic operation showed its advantage, for at no time was there the least obstruction to the passage of the probang into the stomach.

After making as good a joint as possible at the beginning of the œsophagus, I closed the mouth of the pouch by inverting the margins remaining after excision, uniting them by interrupted Lembert sutures. The joint as a whole was not as satisfactory as in the preceding case, owing to the difficulty of adapting the surfaces to each other. Leakage was expected to take place, and the external wound was therefore only partly closed, gauze wicks being left in contact with the line of suture and emerging from the external wound.

The operation was difficult. The patient bore it well, how-

ever, and came out of the anæsthesia in good condition There was practically no constitutional disturbance. As was expected, leakage took place from the œsophagus, the wound soon giving escape to about half the quantity swallowed. The patient was able, however, to take into her stomach sufficient to keep her well nourished. The wound closed very slowly. The patient went home on July 29th. At this time there was a comparatively small loss of food through the wound.

I have received from this patient since her return home the following note:

"MANCHESTER, N. H., September 4, 1899.

"DR. M. H. RICHARDSON:

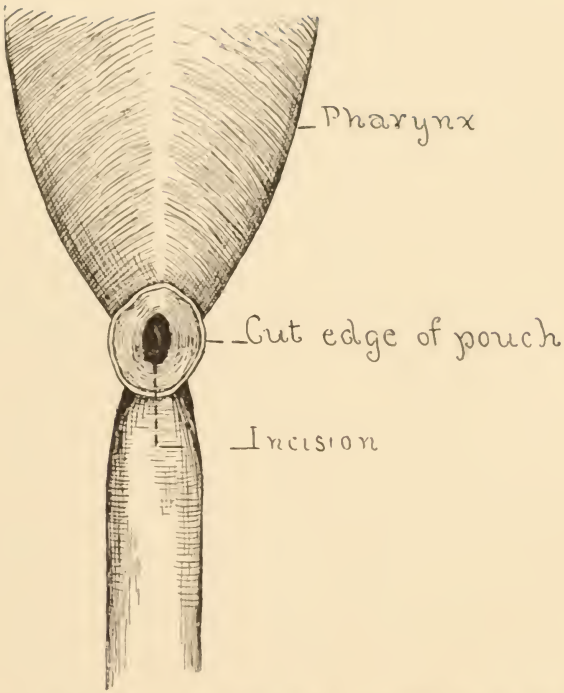
"DEAR SIR: I am pleased to tell you that I am gaining every day. I can eat almost all kinds of solid food, and do not lose any through the wound. I lose very little liquid. I have gained four and a half pounds since I came home."

At the present time the wound is closed and she is in perfect health. Deglutition is normal.

This case presents several unusual features which seem interesting in connection with the etiology and diagnosis, and valuable in connection with the treatment. The pouch differed materially in shape and size from that of Case I. Instead of being deep and narrow, it was shallow and broad; its walls were thick; there was no thinning at the fundus, and there was no translucency. It seemed more like a simple dilatation of normal œsophageal wall above a constriction. Yet it was not such a dilatation, for only the posterior wall was affected, and only a portion of that. Moreover, the opening into the œsophagus was small, admitting only the index finger.

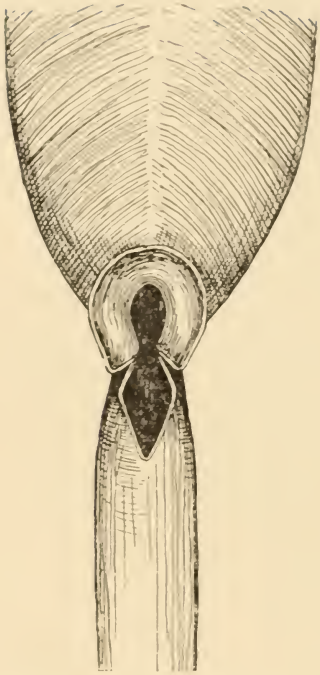
The most interesting feature of this case was the condition of the œsophagus just below the opening of the pouch. This has already been described. The only evidence of constriction was in the extensive laceration of the œsophageal wall at this level, caused by the introduction of the finger. Though the finger was very carefully introduced through the mouth

Fig. 8.



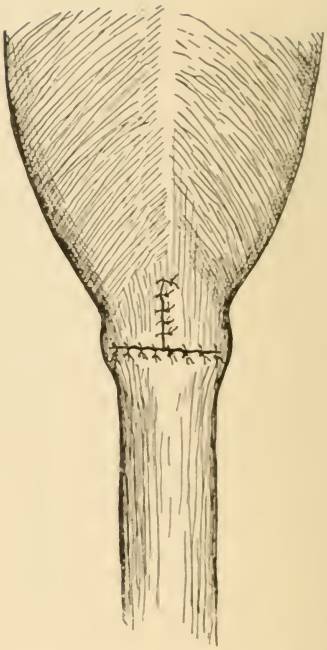
Showing posterior view of pharynx and œsophagus. The pouch has been cut off, leaving a circular margin about the sac. The dotted line shows incision through margin of pouch, neck of pouch, and constriction of the œsophagus. Case II.

FIG. 9.



Showing incised pouch, neck, and œsophagus. Case II.

FIG. 10.



Showing œsophagus and pharynx after vertical suturing of the pouch opening and transverse suturing of the œsophageal slit. Case II.

of the sac into and down the œsophagus, this procedure resulted, as I have said before, in such extensive tearing of the mucous membrane that it seemed at first that there was no mucous lining whatever left. Such an injury to the normal œsophagus would of course be impossible, for it can be dilated to an excessive degree without laceration. Indeed, it may be said that round and smooth bodies, large enough to become firmly impacted, do not cause injury unless the pressure is prolonged for hours or days, and usually not even then. I was entirely at a loss to account for the condition of the œsophagus and to estimate its probable influence in causing the pouch. There was nothing in the history to throw any light upon the case excepting, perhaps, the attack of diphtheria twenty-five years before. This disease may have caused the formation of scar tissue in the lower pharynx and upper œsophagus, the giving way of part of which resulted in the pouch. Moreover, the œsophagus may have been permanently narrowed at its beginning, its mucous membrane being just enough altered to cause the constriction and to become itself fragile. But if there were such changes in the mucous membrane none were noticeable in the muscular layers, for they seemed not abnormal. It appears, on the whole, likely that the theory already suggested in considering the diagnosis is true, viz., that extensive changes in the œsophageal wall resulted in constriction and sacculation; that the usual course of pouch-formation took place; that as soon as there was a distinct bulging the effect of the constriction became greater; that finally deglutition became even more difficult than in ordinary cases of diverticulum, because of the combined effects of pouch and of stricture.

Besides being at a loss to understand the lesion, I was much perplexed as to how to remedy it. Two methods were available: the one to perform some plastic operation upon the stricture, the other to leave a large tube in the œsophagus. By a plastic operation the stricture might be permanently relieved after the Heinecke-Mikulicz method of pyloroplasty; or the strictured portion might be thoroughly excised and an

end-to-end suture made between pharynx and œsophagus. In case neither method was practicable a portion of the sac might be utilized to increase the œsophageal lumen at the level of constriction.

Neither of the first two methods seemed applicable to this case. Linear œsophagoplasty was prevented by the want of laxity in both pharynx and œsophagus. Moreover, the mouth of the sac was in the way. Total excision of the œsophagus, including enough to remove both constriction and sac margin, was inadvisable for the same reason. It seemed best, therefore, as already described, to utilize a portion of the pouch to furnish a new posterior wall to the œsophagus at the level of the constriction. (Figs. 9 and 10.)

Of the treatment of œsophageal diverticula, von Ziemssen and Zenker wrote in 1878 (see *Cyclopædia of the Practice of Medicine*, by von Ziemssen, vol. viii. p. 89):

"The radical cure of diverticula by operative procedure from without is at the present time one of our vain wishes; yet we should hope that even this operation, conducted on Lister's plan, might at some future day be performed without danger. Nothing is to be hoped from attempts to destroy the diverticula by the introduction of astringent or irritating materials through the pharynx—at least from our experience thus far, and from observation of the fact that we cannot, by compression or any other procedure, prevent the entrance of food, or of mucus and saliva, into the diverticulum, even for a short time."

The vain hope of Ziemssen and Zenker has become a reality. In the last twenty years some seventeen cases have been operated upon. Of these all have been successful but one. In the earlier operations the œsophageal wound was kept open with a drainage-tube. In the later operations the œsophagus has been immediately closed, the outer wound being packed temporarily with gauze. In one instance only have œsophagus and outer wound been immediately sutured, and this is the only case in which the wound has healed by first intention. On theoretical grounds there should be no

greater dangers of extravasation in suture of the œsophagus than in suture of the intestine, except, perhaps, that the inverted tissues of the œsophagus do not adhere together so quickly and so firmly as the approximated peritoneal surfaces, so that extravasations are more likely to occur, though the quantity of fluid escaping would naturally be small. Moreover, the contents of the œsophagus are not naturally as aseptic as the contents of the intestine, and it is possible to cleanse the œsophageal part of the operative field before operation by means of swabs, gargles, and mild antiseptics. Furthermore, the danger from local infection in the parts about the œsophagus is not as great as infections in the peritoneum. The ultimate effect in œsophageal phlegmons may be quite as serious as in cases of general peritonitis, but there is a better chance of remedying an accident in the former than in the latter.

The tendency of operations upon the œsophagus is to be more radical and to trust more to the efficacy of immediate suture. The dangers of external œsophagotomy seem to depend more upon an already existing infection than upon a contamination at the time of the operation. I have successfully resected the pharynx in three or four cases for the removal of tumors. In these cases the field of operation was necessarily infected from the pharynx. The infection was, however, a mild one, and did not retard the healing of the drained wound. The only case of œsophagotomy for foreign body that I have had has been a fatal one.[1] In this case an insane woman swallowed an ordinary teaspoon. The spoon was thin and had sharp edges. It became lodged in the œsophagus, pointing downward, with the bowl at the transverse portion of the aortic arch. I removed the spoon by external œsophagotomy without difficulty and apparently without doing any harm. The wound was left open, with a tube in the œsophagus. The patient died in the course of

[1] Since this paragraph was written I have removed successfully portions of a man's suspenders which he had swallowed with suicidal intent some fourteen days before operation. The buckles became caught at the level of the aorta, where they were demonstrated by means of the X-ray.

two or three days. The cause of death was not discovered. There was neither abscess nor phlegmon. It may have been that, like many insane patients, she did not have the power of withstanding a severe operation.

Numerous cases of external œsophagotomy for foreign bodies show clearly the dangers of this procedure. As already stated, however, it should be borne in mind that, at the time of the operation, the chief dangers are already present, and that it is to relieve these quite as much as to remove the foreign body that the operation is performed.

Simple excision of œsophageal diverticula has been performed thirteen times and inversion and suture twice (Girard). With the cases reported by Hearn at the American Surgical Association in 1899 and with the two cases here recorded there are now seventeen. The successful cases are as follows: Kocher, 2; von Bergman, 1; Schwarzenbach, 1; Butlin, 2; Girard, 2; Bayer, 1; Mixter, 1. Niehaus had a fatal case, and an unknown London surgeon another. (Butlin reported that an unknown London surgeon did one case which died of suppression of urine.) Niehaus performed gastrostomy and removed the sac fourteen days later, with fatal results. Whitehead performed gastrostomy in one case. The patient survived eight years. Chavasse treated a case in the same way, with fatal termination.

The cases of œsophageal diverticulum reported now number fifty-six.

The usual method of treating œsophageal diverticula has been by excision and suture. In the earlier cases attempts were made to keep the œsophagus open by means of probangs. These palliative methods need no further consideration. To prevent starvation and to prolong life, when excision of the pouch is impracticable or impossible, recourse should be had to gastrostomy.

In favorable cases, after removal of the pouch, the œsophagus should be immediately sutured. If the external wound is tightly closed it should be reopened at the first indication of wound infection. As a rule, it seems the safer plan to

use temporary wick drainage. In case of complications which permanently prevent deglutition, and thus endanger life through starvation, gastrostomy must be resorted to.

To avoid opening the œsophagus, Girard, of Berne, has twice invaginated the diverticulum, so that its internal surface projected into the œsophagus. In two cases operated upon in this way recovery followed. Such a procedure seems to me, however, not nearly so satisfactory as removal of the pouch. The inverted sac rests in the œsophagus, and cannot but obstruct it more or less. The orifice, which after inversion points externally, is closed by three layers of sutures. This leaves a blind space which may become filled with blood and cause serious obstruction or may become septic. In Girard's cases, however, the pouch became shrivelled and atrophied and no longer obstructed the passage of food. It would seem a more dangerous operation than the opening of the œsophagus. The method of inverting the pouch would probably have been impossible in Case II. Moreover, had inversion been successfully accomplished, the lumen of the œsophagus would undoubtedly have been practically closed. The method should, nevertheless, be considered as a practical resource in those cases in which, for any reason, excision and suture seem inadmissible.

The cause of pouches is unknown. It is by some thought to be congenital ; by others to be a general weakening of the lower part of the pharynx and the upper part of the œsophagus in an area the least protected by muscular fibres. A small depression which here exists opposite the cricoid cartilage, allows the momentary impaction of food. Constant swallowing, with temporary enlargement at this point, causes a bulging, which after a while becomes so great that the food is permanently retained. The food remaining here causes the pouch to increase in size. With the increase in size the fundus of the pouch becomes thinner and thinner, as does rubber pellicle under pressure. When by sacculation the pouch has become pear-shaped the enlargement is hastened by gravitation. As the fundus becomes more and more dis-

tended its walls are correspondingly thinned and weakened. One would, therefore, expect the pouch to increase more and more rapidly in both depth and capacity—an expectation which clinical evidence justifies. The increase would doubtless be even more rapid than it is except for the restraints in the path of its enlargement.

The pathology of œsophageal diverticula shows that although they are called pressure diverticula, and though pressure is doubtless an etiological factor in connection with the presence of scar or other weakened tissues, yet a constriction of the œsophagus is not essential for their formation. Indeed, in all the cases reported no stricture has been found. Though strictures may not have an etiological influence in causing pulsion diverticula, they may, when situated low down, cause a general dilatation of the œsophagus. From *à priori* reasoning, obstructions high up in the œsophagus cannot be without effect in the production of pressure pouches, for they cannot but increase the pressure. Changes in the lower pharynx and upper œsophagus which tend to result in bulging are unusual; benign stricture of the œsophagus is even more unusual; a combination of the two would be extraordinary.

An interesting subject in connection with the operation is that of recurrence. Resection and suture necessarily leave scar tissue at the very point where the bulging first started. Moreover, the condition of pharynx and œsophagus remained unchanged; so do the peculiarities of diet and deglutition. So far as I am aware, however, there have been in these cases no recurrences after operation, although sufficient time has elapsed since the earlier ones for recurrences to take place.

THE EXPLORATION OF THE ABDOMEN AS AN ADJUNCT TO EVERY CŒLIOTOMY.

By Howard A. Kelly, M.D.,
Baltimore, Md.

I had occasion in several instances, some sixteen years ago, to make post-mortem examinations and to remove through an opening in the vaginal vault in women, and through the perineum and through the rectum in men, various viscera which I was desirous of inspecting.[1] I was enabled in this way to secure specimens not only from any part of the abdominal cavity, but by perforating the diaphragm, from the thorax as well, removing in one instance both heart and lungs. I recall with particular distinctness my first case, a woman with large white kidneys whose history I had followed with unusual interest, and where I had reason to feel assured I would be refused the privilege of an autopsy by the unintelligent relatives, abetted by the undertaker. I was in this instance able to remove both kidneys through the vault of the vagina without leaving any external evidence whatever of the depredation committed.

I cite these cases, not without considerable misgivings as to the propriety of my conduct in thus stealing an autopsy, in order to show how easy it is to reach all the various viscera through an incision as far as possible from the centre of the abdomen, large enough to admit the forearm, as well as to urge the propriety, or rather the necessity, of making a

[1] A method of post-mortem examination of the thoracic and abdominal viscera through vagina, perineum, and rectum, without incision of the abdominal parietes. —Medical News, June 30, 1883.

somewhat analogous investigation of all the abdominal viscera every time the abdomen is opened in the living subject.

Although I had not infrequently made such examinations from the earliest years of my work, in common I suppose with other surgeons, I was led to adopt the investigation of the abdominal and pelvic organs as a routine plan to be followed in all cœliotomies by the following circumstance, which caused me no little chagrin: I was treating a woman for pelvic peritonitis with adhesions binding down both tubes and ovaries. I first broke up the adhesions under anæsthesia, and then, finding that she continued unrelieved, in December, 1894, I opened the abdomen, brought the adherent tubes and ovaries up out of the incision, carefully freed all adhesions and returned the now fairly normal organs, and finished by suspending the retroflexed uterus.

She passed entirely out of my hands, and I did not hear from her again further than to realize that the success of my work was but a qualified one, until a number of months had elapsed, when she wrote from a distant point saying that she had undergone an operation for chronic appendicitis, by which she had been entirely relieved, and that she was convinced that this had been the real cause of all her discomforts as well as of the pelvic inflammation which I had been treating.

Whether the reproach was deserved in this case I have had no means since then of deciding, but I acted upon the assumption that I was blamable for neglect, and took the lesson to heart, and have ever since that date inspected the vermiform appendix in every instance in which I have made an abdominal incision large enough to permit such an examination, and have recorded its condition in writing on a slip kept by the anæsthetizer during the operation; furthermore, realizing that not only the appendix might be at fault but some other abdominal viscus as well, I have made a systematic examination of the entire peritoneal cavity in every instance in which the condition of the patient did not forbid it.

It will, I am sure, be easy for any surgeon to whom this proposition is presented for the first time, upon pausing to

consider the matter to adduce shortly a number of excellent reasons why such a practice should sometimes prove serviceable ; let us consider some of them.

In the first place, abdominal diseases of all kinds are commonest in middle life, the period when most of our cœliotomies are performed, and it becomes practically certain, reasoning simply from the law of chances, that a coincidence of two or more entirely independent diseases is sure by means of this examination to be discovered occasionally.

In the second place, there is a constant association between certain abdominal surgical affections and affections elsewhere in the form of a mutual interdependence, whether from the propagation of a disease from a central point, as in the case of cancer, sarcoma, and tuberculosis, or from a mechanical action, where the effects of pressure are manifested near to or at a distance from the seat of the disease, as in the case of pelvic tumors or inflammation obstructing the vascular, the urinary, or the alimentary channels.

In the third place, such an examination if negative gives both operator and patient a comfortable assurance that the convalescence will progress without interruption, as well as the satisfaction of realizing that there is no visceral affection in progress which is liable in the near future to shorten life or to impair health. (See Fig. 1.)

The following diseases are most likely to be found in such a routine examination : appendicitis, hernia, either inguinal, femoral, or umbilical, hydroureter, disease of the omentum, pyloric cancer, movable kidney, enteroptosis, cancer of the liver, perihepatitis, gallstones.

In making an investigation, or rather in taking an inventory of the abdominal cavity in this way, certain of the organs can be inspected as well as handled, while others can only be felt. The range of vision is limited to the area adjacent to the incision and those structures which can be drawn over into the neighborhood of the incision ; the field is of course extended by enlarging the incision. In a lax or scaphoid abdomen, where the reserve space is large, the abdominal

walls may sometimes be hooked up well away from the viscera, which can be seen by stooping down and looking in or by inserting one of my largest calibre rectal specula and using a headlight. This extension of the field of inspection is also often feasible after removing a large ovarian or a large fibroid tumor.

There are four steps in the exploration of the abdomen :

First, the simple inspection of such structures as can be seen in the neighborhood of the incision by drawing the lips of the incision widely apart.

Second, the examination of those structures which can be brought into view by inserting two fingers through a small incision and catching structures near by, such as ovaries, tubes, cæcum, and appendix, as well as uterus.

Third, by the insertion of the hand as far as the wrist, by which the colon and the stomach and the pylorus can be grasped and palpated or pulled down, and

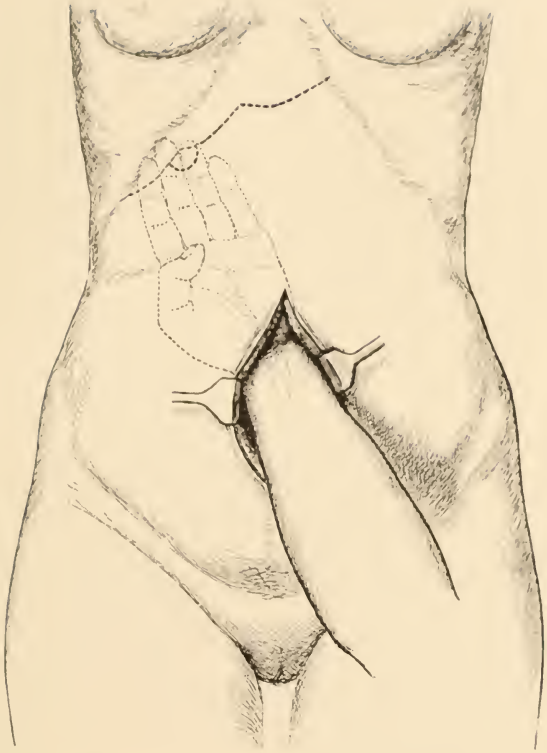
Fourth, by the insertion of the forearm in order to reach the liver, the gall-bladder, the kidneys, and the spleen.

The technique of such an exploration is this : extreme care must be taken to maintain asepsis by thoroughly sterilizing the arm or by wearing a rubber glove with a long sleeve reaching as far as the elbow, which I have had made for this particular purpose. (See Fig. 2.) If the field of the operation, that is to say, the area in the immediate neighborhood of the incision, is so septic as to demand the use of drainage, then the operator would best forego the advantage of the more extended examination on account of the risk of distributing the septic material.

The length of incision necessary for a complete exploration of the abdomen must vary from 10 or 12 cm. to 15 cm. (6 to 9 inches) according to the size of the operator's forearm ; it must be so large that he runs no risk of bruising the tissues by forcing in the arm through a tight opening.

The best posture in which to examine the patient is either lying flat on the table or with the pelvis slightly elevated ; a decided elevation often causes the appendix to gravitate up

Fig. 1.



Method of exploring the abdominal viscera.

Fig. 2.

Rubber gauntlet.

out of reach for inspection unless one uses dangerous traction on the cæcum to bring it down.

The various structures are examined in an order which must vary with the location of the incision; when the abdominal opening is made low down over the middle of the pelvis, I commonly follow some such routine as this: after carefully noting the condition of each pelvic viscus, uterus, tubes, ovaries, bladder, and rectum, I then look at the internal inguinal rings, locating them if necessary by the round ligaments, and testing them with the index finger to see if there exists a hernia, and if so I proceed to sew it up at once from the inside of the abdomen, first passing the needle through the outer pillar of the ring and then through the inner, using one or two mattress sutures of silk; another row of sutures draws the peritoneum over the first line so as to bury them; in this way the hernia is closed from the inside, the side on which the pressure falls first, and, therefore, in the position of the greatest mechanical advantage.

The umbilical ring is next examined, and if there is an opening it must be closed in like manner from the inside with one or two mattress sutures. The bladder is then examined for adhesions, which are often found on its peritoneal surface. The rectum also will often be found involved in a pelvic peritonitis, especially near the pelvic floor.

The next point of importance is the vermiform appendix, for which the pelvis ought not to be elevated at all. Unless the abdominal walls are thin, the incision must be larger than that used for suspension of the uterus by my method, that is to say, over 4 or 5 cm. in length. The cæcum can be best caught and drawn into a small incision by grasping the bowel in the right iliac fossa by the last phalanges of the index and middle fingers, between the dorsal surface of the index and the palmar surface of the middle; in this way the appendix can be brought into view when the incision is only large enough to admit two fingers.

The cæcum secured and brought out, the appendix is traced by following the anterior band of longitudinal muscular

fibres, and when found it should be removed if it shows any traces of previous inflammation. In a series of 115 cases in which the condition of the appendix was noted at the operation, it was found adhering to the right tube or ovary in 10 cases; in 37 cases it was involved in adhesions; it was congested in 3 cases, and obliterated at the cæcal end in 1 case. Only 64 appendices were perfectly normal.

In a series of 200 abdominal sections I have had occasion to remove the appendix twenty-five times.

The routine inspection of the ureters in gynecological operations is perhaps as important as that of any other abdominal organ after the appendix, and for this reason every surgeon should be thoroughly familiar with the ureteral landmarks. The best place to find the ureters is where they lie upon the common iliac arteries at the pelvic brim; on the right side the ureter may be seen, upon lifting up the inner border of the cæcum, crossing the brim with the ovarian vessels. If watched for a little while a peristaltic wavelet, at once establishing its identity beyond a doubt, will be seen travelling down toward the bladder. On the left side it is necessary to draw the sigmoid flexure in the same direction, that is to say, toward the median line, in order to effect a similar exposure. In cases of carcinoma and myoma uteri and ovarian cysts such an examination will often reveal the presence of a hydro-ureter; in suppurative pelvic affections a pyo-ureter may be found.

A case which I operated on in Paterson, N. J., at the request of Dr. J. C. McCoy, serves beautifully to illustrate the point I wish to make here. The patient had a fibroid uterus reaching as high as the umbilicus, and altogether about as large as a six-months' pregnancy. I removed it by my method of supravaginal amputation, cutting from left to right. I then examined the adjacent structures and found the appendix bound down by adhesions in the pelvis, and removed it. Then, after stating to a number of gentlemen who were present the importance of examining the ureters also in such cases, I proceeded to investigate carefully and found on the

right side an extensive pyoureter leading up to a pyonephrosis, whose presence there had been no clinical reason whatever to suspect.

I accounted for the pyonephrosis in the following manner: the myomatous uterus which filled the pelvis had backed up the urine by pressure at the brim, causing a hydroureter and a hydronephrosis, then came the appendicitis, adding the element of infection conveyed through the tip of the appendix, which I found firmly soldered down in the pelvis upon the ureter about 4 cm. below the brim of the pelvis.

Dr. McCoy at a later date removed the right kidney, completely curing the patient. By making a routine examination of and discovering the complication at the first operation, I saved myself the possible, and I think proper, imputation of having ligated the ureter, and so of having caused the pyelonephrosis. I furthermore made an accurate diagnosis as to the presence and location of the complication, and determined that the opposite side was unaffected, so making the subsequent operation a safe instead of a hazardous undertaking.

The position of the transverse colon and the stomach is to be noted on account of the frequency of enteroptosis.

Up to this point it has only been necessary to introduce the hand as far as the wrist; it now becomes necessary to introduce the forearm, and for this purpose the edges of the incision are protected with gauze, and the omentum held down while the hand is pushed in, in front of it, with fingers extended and thumb pressed into the palm so as to take up less space. Whichever hand the operator uses he should stand on the corresponding side of the patient and push the hand first back into one flank and then into the other, and thus palpate both the kidneys, noting their presence, size, form, and mobility by sliding them up and down. The renal pelvis may be felt and inverted toward the calices to detect a stone. After the kidneys, the liver is felt, its apparent size, the regularity of its surface, its margin, any adhesions which when present indicate perihepatitis. Most of all the superior viscera the gall-bladder is next located by feeling

the fissure between the right and left lobes of the liver, and then palpating across the lobus quadratus to the depression on its right side where the gall-bladder is found, as a rule, well distended.

By taking it between the thumb and two fingers and squeezing it with moderate force, a healthy gall-bladder collapses slowly as the bile is forced out into the hepatic and common ducts. Not infrequently on recovering from the anæsthetic such a patient vomits at once a quantity of golden-yellow bile. When the gall-bladder is collapsed one can then readily feel a stone if it be present, by pressing its walls together.

I next put my index finger in the foramen of Winslow, easily found below the gall-bladder, and palpate the hepatico-duodenal ligament and trace the common duct down for several centimetres, feeling for a stone there. The spleen may then be felt, taking the stomach as a guide.

Finally, the pancreas is found by carrying the hand in under the omentum and palpating through the transverse mesocolon.

The aorta may be palpated throughout the entire length of its abdominal portion by pressing the fingers back against the vertebral column as the hand is withdrawn.

The retroperitoneal glands on each side of this bony column can also at this time be thoroughly examined.

In a case of Dr. G. P. Yost's, in which a patient convalescent from typhoid fever was suddenly seized with severe pains, marked elevation of temperature, and had a decided distention of the abdomen, there was reason to suspect an attack of acute appendicitis or perforation of the intestine. In this instance I made an incision just inside the anterior superior spine of the ilium, and finding the bowel and appendix normal, but the peritoneum everywhere in a state of subacute inflammation, and the abdominal cavity full of a dark thickish fluid, I explored the rest of the abdomen through the incision, and was rewarded by finding a stone in the gall-bladder. A close examination of the fluid showed that it was

probably bile, and the diagnosis of ruptured gall-bladder following typhoid fever was therefore made and the abdomen opened above, the stone removed, and the gall-bladder drained, and the patient recovered.

In another instance in which the patient located her pains under the liver and there was every reason to suspect the presence of gallstones, upon finding none I palpated all of the abdominal viscera through the incision made in the linea semilunaris just below the ribs, and found far down on the pelvic floor a large hæmatoma of the left ovary, which was at once removed by a suprapubic incision.

I shall not pause to cite cases in which isolated carcinomatous nodules have been found upon carefully searching through the omentum, or enlarged mesenteric glands in peritoneal tuberculosis; or in other cases in which a carcinomatous infiltration has been discovered in the pylorus or nodules in the liver, in each instance materially affecting the prognosis as to complete recovery.

In cases liable to metastasis, such as those just cited, it is my practice to reverse the order of the investigation wherever possible, making the exploration of the abdominal viscera first and then doing the operation. If I find a metastasis which is out of the reach of surgery, I would not then feel justified in taking the same risks in removing say an advanced carcinoma in the pelvis.

In conclusion, let me recapitulate and restate the points I desire to emphasize, presenting them from a slightly different stand-point.

The important lesson I wish to inculcate is that, provided an incision has been made in the abdominal parietes large enough to admit the entire hand, and, therefore, the forearm, it is always an advantage to the patient to be able to assure him that as far as touch could ascertain there is no disease of any other abdominal organ.

Under some circumstances where there is reason to suspect disease of one of the other viscera not in the proximity of the field of operation, I would make a larger incision than neces-

sary for the performance of the operation for the very purpose of making such an exploration.

There are in general three classes of cases to which this extended examination may be applied :

Firstly, those in which there has been no reason to anticipate any disease of any other organ and the examination is made simply as a routine procedure, whenever it adds nothing to the gravity of the situation. In such cases we are most liable to find unsuspected hydroureter, appendicitis, movable kidney, gallstones, and occasionally pyloric tumor.

Secondly, those cases in which on opening the abdomen, contrary to expectation, no disease is found near at hand. The operator may then find it of great advantage to enlarge the incision, introduce the hand and the forearm, and explore the entire abdomen. I have cited a case of this sort in which I made an incision over the appendix, and finding no appendicitis, enlarged the opening and found a gallstone within a ruptured gall-bladder ; also, another case in which gallstones were believed to be present, but in finding the diagnosis at fault I introduced my arm through the enlarged incision and found a large hæmatoma of the ovary.

Thirdly, the group of cases in which there is a definite percentage of chances that the disease discovered at the time of operation is complicated by the affection of some other organ, neighboring or remote. In cancer of the ovary I examine all the organs, and in no small percentage of cases have the disappointment of finding metastases in the omentum, pylorus, or liver. In pelvic inflammatory disease the appendix will be frequently found involved, and in the case of pelvic tumors as well as inflammation the ureters are prone to suffer from compression.

ONE HUNDRED AND TWELVE CASES OF PREGNANCY IN UTERUS BICORNIS.

By George H. Noble, M.D.,
Atlanta, Ga.

Mrs. F. D. M. was admitted to my infirmary January 27, 1899. She was in the ninth month of gestation, and complained of having severe pains through the lower part of the abdomen since the fourth month of pregnancy, for which she had been taking large quantities of morphine and whiskey. In this way she would secure relief for a short time only. The pains returned at such short intervals that the frequency of the doses became a serious matter, necessitating the withdrawal of the drug, which was followed by spontaneous labor. Inspection and palpation of the abdomen disclosed nothing except that it was very prominent anteriorly.

There was no lateral distention or sulcus at the fundus to create suspicion, consequently nothing abnormal was suspected before delivery.

Labor terminated in a reasonably short time, on January 29, 1899. It was impossible to estimate accurately the number of hours on account of the persistence and violence of the pre-existing pains.

There was no effort on the part of the uterus to complete the third stage of labor, due perhaps to a deformity detected while resorting to Credé's method of stimulating the uterus and in extracting the secundines, the latter becoming necessary on account of inability to excite sufficient uterine contractions or to expel them by expression of the uterus. The deformity mentioned was a uterus bicornis, the right horn of which had contained the fœtus. The left horn was spindle-shaped, directed obliquely upward and outward, about

twelve inches in length and eight in diameter, and was connected by a short, thick pedicle to the other part of the uterus just above the internal os. Introduction of the hand proved the right cavity to be empty, except for that portion of the amniotic sac which enveloped the fœtus. The aperture of the left horn was constricted and not much larger than the umbilical cord, which passed through it. The placenta entirely filled this part of the uterus, extending from the pedicle to the apex, and through it into the Fallopian tube. Removal of the placenta necessitated the introduction of the arm above the elbow and the passage of the hand to the extremity of the left horn, where I found an opening large enough to admit two fingers, through which the placenta protruded. My first impression was that the uterus had ruptured, and that the afterbirth had extruded through the tear, but during uterine contractions the margins of the opening became round and smooth, thus dissipating the idea of a laceration. By pressing down the Fallopian tube upon the hand within the uterus I was enabled to sweep my fingers around the portion of the placenta projecting into it (the Fallopian tube), and found it adherent to the walls, from which it was separated by a sawing motion of the fingers. In forcing the globular mass into the cavity of the left uterine horn considerable expression of the tube was necessary, in addition to which traction was made by hooking the two fingers within the tube around the mass. After freeing the tube, clearing the secundines from the left horn was accomplished without difficulty. The contractions in the uterus then became normal, but the Fallopian tube filled with blood, which required removal several times and compression in order to stop bleeding. Before this was accomplished I seriously contemplated abdominal section and removal of the appendages on that side, as the condition was very similar to that of ectopic gestation with separation of villi, that is, liability to hemorrhage and sepsis; but, as drainage through the uterus was free, I decided to await developments. Progress of the case was very satisfactory, with the exception of the tenth day, when the temperature went to 103° F., but

Fig. 1.

Mrs. F. D. M.'s case. Fœtus was in right side and placenta in left side, extending into the left Fallopian tube.

subsided in an hour or two, after which there was no evidence of sepsis.

The placenta was shaped like two triangular pyramids placed base to base, with a globular mass at the apex of the upper one. The attachment being directly in the angle of the uterus, there were two planes representing the maternal surface and one the fœtal. It was three inches through from the fœtal surface directly back to the most elevated portion of the maternal surface, its width was six and its length ten inches. The globular mass mentioned was about the size of a base-ball, and represented the portion of the placenta which occupied the Fallopian tube. Evidently no distinct constriction or demarcation existed at the junction of the left horn and Fallopian tube, but, on the contrary, the deformity of the horn must have continued directly into the tube, producing a funnel-shaped canal, resulting in a very patulous communication between the two. Pregnancy must have occurred close on the uterine side of the abnormally large opening; the placenta, extending in both directions as it developed, became attached to each. (Fig. 1.)

The case of double uterus and vagina that came under my observation was Mrs. C. H., who had been recently married, and desired relief of very severe dysmenorrhœa. In the examination I found the double uterus and vagina complete, the left side having been dilated, the vaginal orifice of the other one was smaller and fringed with an annular hymen. The left uterus was the largest, yet both were well developed with perfect cervix to each, except that the inner side of each was situated close together and attached to the vaginal septum between them. The latter was very thick, tough, and complete, extending to the meatus urinarius anteriorly and posteriorly dividing the commissure into two distinct angles, one for each vagina. The septum between the vaginal orifices was one and a half centimetre thick.

Both wombs were dilated for the dysmenorrhœa, with relief. She became pregnant on the left side, and aborted in the fifth month.

There were no features of interest in this event except that

it was preceded several weeks by uncontrollable pain. At the time it was very noticeable that both vaginæ had been about equally dilated.

The importance of cutting down the septum was impressed upon her, to which she signified assent for it to be done later, but as usual it was delayed from time to time until pregnancy again occurred.

At her confinement, which occurred in May, 1895, the vaginal septum became a positive obstruction to the advancement of the fœtal head, and as retraction and thinning of the lower segment of the uterus and adjacent portion of the vagina was taking place the septum was cut away. It was necessarily very vascular, as all who have performed operations in the vagina just before or during labor must know. Needle punctures would bleed alarmingly until the tissues were finally compressed by tightly tying sutures. The septum was clamped by two pairs of compression forceps, a ligature passed on the outer side of each, and the division cut between the instruments. The process was repeated step by step until the septum was severed completely. Immediately the head began to advance, and labor terminated naturally.

The third case, a resident of Calhoun County, Alabama, was a well-developed woman, thirty-four years of age, who had four children, all from the left side of the uterus. The other, or right, side not having been pregnant, was smaller. There were two distinct cervices projecting into the vagina, the left showing marks of deep laceration. She had, prior to her first confinement, two abortions for which she could find no cause.

Of one hundred and twelve pregnancies in uterus bicornis the age was given in fifty cases, averaging twenty-seven and one-half years, only three reaching the age of forty.

They were pregnant upon the left side thirty-six times, upon the right side thirty times, on both sides (twins) three times. In two cases the fœtus was in one side and the placenta in the other. There is very little difference in the sides impregnated; in fact, the deformity is just as apt to occur on one side as the other, consequently pregnancies must bear similar relations.

I find a record of fourteen cases only in which the decidua was thrown off or was removed from the empty horn. While this is a very small percentage of cases, the question of decidua seems to have been overlooked in the reports, the natural inference is therefore that casting of decidua is very likely to be more common than these figures indicate. While the passage of decidua is a corroboration of pregnancy it does not aid in making a distinction between the subject in question and tubal pregnancy. However, it is a subjective sign worthy of consideration.

There was menstruation or bloody discharge in eighteen cases, varying from a month to the entire term, accompanied by pain. At times free, and in a few additional instances hemorrhages occurred without abortion, the blood evidently coming from the unimpregnated side. As far as I know, this is not apt to occur in uterus septus.

Pain is mentioned in thirty-two of the one hundred and twelve cases. It is usually cramping, though sharp or lancinating pains are not uncommon. They usually occur when there is a bloody discharge (menstrual or otherwise), and about the third and fourth months when the pregnancy is in an undeveloped or pedunculated horn. They are the premonitory signs of rupture, and when such accidents occur they become very severe, cease suddenly, and are at once followed by shock, usually extreme.

Dysmenorrhœa is very common to this deformity, cramping pains predominating, the history of which should be regarded as one of the subjective signs.

The rapid distention of an undeveloped horn must necessarily cause much pain, due to overstretching of the thin muscular walls.

In uterus septus, or where the body of the uterus is not developed into two separate parts, but the cavity divided into apartments by a septum, pain is not a feature. The septum rarely gives trouble, and then only as a factor in post-partum hemorrhage. Clinically the uterus septus need not be regarded a serious deformity.

The number and character of pregnancies are interesting studies. They show little danger in uterus septus, with the hazard gradually increasing as the deformity grows worse on down to rudimentary horns connected by pedicle.

Of eighty-four women there were one hundred and eighty-one pregnancies. Of this number there were one hundred and eight normal deliveries, which occurred for the most part in the cases with uterus septus, some becoming pregnant from five to twelve times, some aborting three to five times. But the abortions and premature deliveries occurred in the main in wombs of greater deformity. The greatest period of liability was three to four months in the bifid uterus and rudimentary horns. When the uterus was better developed abortions did not occur until later in the period of gestation. Twenty-five cases were pregnant one time each, seventeen pregnant twice, mainly cases of bad deformities, a very wide difference between the two extremes of malformations.

In the undeveloped or badly deformed wombs one or more abortions preceded normal delivery. This is an evidence of the necessity of development before the capacity of the uterus can accommodate a full term fœtus. This does not apply to uterus septus.

Twin pregnancies are more common than in normal conditions; just why this should be the case it is impossible to explain, for malformations can have no effect that I can see except in uterus diadelphys or duplex, where menstruation continues after pregnancy; in such circumstances impregnation of the empty side can and does occur, provided they have appendages sufficiently developed.

The position of the fœtus is influenced by the lateral development in uterus septus and uterus bicornate, especially when the bifurcation is not low. One case in eight confinements had three transverse and one shoulder presentation. To normal presentations is the tendency in the rudimentary horn; the spindle-shaped sac necessarily forces the fœtus in its long diameter.

The chief dangers are rupture and abortion, and, exceptionally, retained fœtus. Sepsis follows any of these, and, where

hemorrhage does not destroy life, is a potent factor for serious evil. Death of fœtus and infection of peritoneum through lymphatics, bloodvessels, and by direct extension is not uncommon. Septic infection is a common cause of peritonitis, and is more likely to occur in the earlier months of gestation.

There were seven cases of retention of fœtus, four for twelve, two for fifteen, and one for eighteen months after death of fœtus (Elbing's).[1] Two reported as bicornate uteri, the other four as rudimentary horns connected by pedicle. It seems that pedunculated horns are comparatively free from common causes of infection, consequently retention may occur and remain longer than in any other condition of the womb. They more nearly approach the conditions of tubal pregnancies, especially the cases of solid pedicle or almost occluded communications. These are dangerous cases.

The greatest danger of rupture is at the fourth and fifth months; before and after that time it is very nearly equally divided. The earliest recorded period was fourteen weeks, the latest at full term; in the latter case rupture occurred before labor set in. Hemorrhage is frightful, and usually terminates the case before surgical assistance can be had. Of the twenty-two recorded cases of rupture only one is mentioned as having recovered. In that case the horn developed between the folds of the broad ligament, and had neither tube nor ovary. It was a very thin sac, the tear occurring in the thin parts produced no hemorrhage—thus one instance of recovery by surgical intervention.

The majority of these ruptures occurred in the rudimentary horn or horn connected by pedicle. In bicornate uterus or uterus septus, where the product can be extruded, abortion is more apt to occur when the development of the organ is not sufficient for the gestation to continue to full term, showing decrease in the danger of rupture as the deformities are less pronounced. Cramping pains sometimes precede rupture, but not sufficiently often to be regarded as a constant pre-

[1] Case 69 (Pfeffinger's) is said to have had retention of fœtus in rudimentary horn for thirty years.

monitory symptom; but when they do occur should not be passed unnoticed. The cause of such fatal hemorrhage in rupture is the inability of the defective uterus or horn to contract and occlude the ends of the immense sinuses. They are not surrounded by a mass of uterine tissue as in normal pregnancy, but run through thin sacs invested poorly with uterine muscles; some of these in the thinnest parts contain no muscular tissue at all. For instance, one case had one side of the sac formed almost entirely by fœtal membranes and adherent intestines. Rupture of a sac of this character, when large bloodvessels are severed, must necessarily mean fatal hemorrhage, as nature is powerless to even modify the flow of blood for a short space of time, much less afford an opportunity for preparation and operation.

The character of deformity varies from simple septum uteri to a multiplicity of varieties of bicornate wombs, rudimentary horns connected with pedicle, and complete double uterus and vagina, including reduplication of ostium vaginæ. Uterus bicornis is the term usually applied to all these, but designates in a general way only the kind of deformity referred to.

The great majority—55 per cent.—are known as uterus bicornis proper; 25 per cent. of the whole, or about half of these, being rudimentary horns connected by pedicles. These are the most dangerous from any stand-point, except that abortion does not occur in them so frequently. Even then serious complications arise from the extreme difficulty in evacuating the pregnant horn, hemorrhage and sepsis frequently following. Spontaneous abortion is mechanically difficult, due to the narrow pedicles, some of which are solid; in the latter abortion is impossible; rupture, internal hemorrhage, sepsis, retention, lithopedion, are most to be feared.

Bifundal and simple septus deformities are not regarded as serious impediments to parturition, and form only a small percentage of these cases. I think, however, that they are more common than usually believed, for it is a condition almost invariably overlooked except when some accident or complication arises.

Uterus duplex occurred in 14 per cent., and half of these

had vagina septus—that is, a partial or some attempt at formation of septum in the vagina. A slight development of this character may not be regarded as a cause of dystocia. Vagina duplex is a positive obstruction in most cases. The uterus was duplex in 14 per cent.; in half of these the vagina was also duplex, and several required cutting away, some others were torn through by the advancing head. Hemorrhage from the cut septum was excessive in some. In those that were torn bleeding was controlled by pressure of fœtal parts. When operating, the vaginal septum should be cut between ligatures, and these removed at the earliest day possible to overcome liability to sepsis. It is safer to operate before labor comes on, as the edges of the mucous membrane can be brought together, thus preventing granular surface and liability to the dangers of the puerperal period.

In rudimentary horns the pedicles were solid in 14 per cent.; that is, no communication between the pregnant horn and uterus could be found. It is a question, however, whether they were really solid or not. Small canals must necessarily require a persistent search with the microscope, and then they may not be found. They may be so compressed by swelling or thickening of its lining mucosa after impregnation as to mislead or escape an expert microscopist. Again, pregnancy by migration of the ovum and spermatozoa in such a relatively large number of cases must mean that the peritoneal cavity is normally overrun with the spermatozoa in search of stray ovules, which, in their mad rush for safety, seek out and hide in vain within the deeper recesses abnormally formed. If the peritoneum possesses the power of absorbing the ovules from the ovary the process must be comparatively slow, or they would not have time to find and enter the defective Fallopian tube usually attached to the rudimentary horn. Again, pregnancy has occurred in rudimentary horns without appendages (Serejnikoff's case). The route of the ovule was through the Fallopian tube of the opposite horn; through the horn of that side into the rudimentary horn, through its own pedicle. In such a case the ovule migrated, the spermatozoa having a direct route. (Fig. 2.)

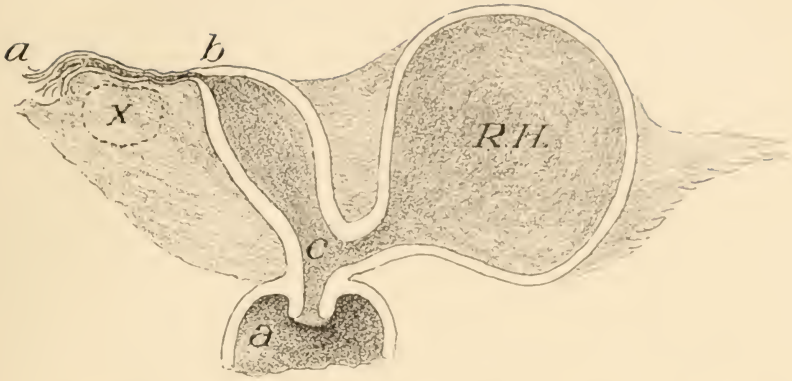
While it has been generally believed that the power of movement possessed by ovules is limited and responds to the movements of cilia in Fallopian tube, or a movement in the direction of the cavity of the uterus, two cases (see also Hollander's case) show that it has passed from one cavity to cervix, and from there to a second cavity, or in an upward direction, travelling upon the epithelium very much the same as the spermatozoa.

When the pedicle is solid and the rudimentary horn has attached to it a perforate Fallopian tube, migration is done by spermatozoa—a thing harder to believe than the case above mentioned. If the spermatozoa have such a free access to the peritoneal cavity, the gonococci which are so frequently associated with it ought to be more often found on the surface of the peritoneum. (Fig. 3.)

The frequency of such improbable routes of ovules and spermatozoa would lead one to believe that the same thing would more often occur in a normal uterus, where ovary on one side and Fallopian tube on opposite side were removed. While this has been frequently done, pregnancy has been the exception. I am constrained to doubt the statement that such a large percentage of pedicles in above cases were solid, believing that sufficient search was not made in every case for open communications.

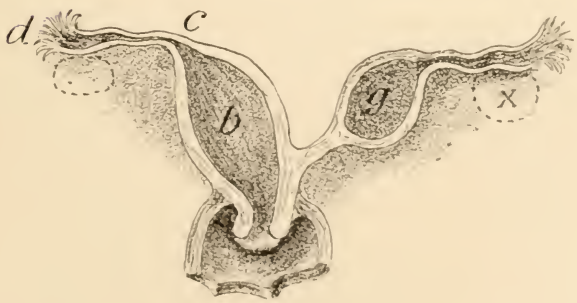
Open pedicles have been found in a smaller percentage of cases, contrary to expectations. In these the pregnancy occurred through the attenuated canal running through them. When the ovum was found in one horn and the placenta in the other the pregnancy occurred in the side containing the latter, and the fœtus found its way into the opposite side by obeying the law of growing in the direction of least resistance —that is, it escaped from the placental side as the development of the after-birth forced it downward in the direction of the junction of the two horns, from which point its entrance into the side was in obeyance to the law above mentioned. Occasionally a very short or defective horn forms a mere pocket near the fundus in which the after-birth or a portion of it may develop in such a way as to seriously complicate its

FIG. 2.



Ovule passed from ovary, X, through Fallopian tube, *a b*, into horn, *c*, and thence through the pedicle into the rudimentary horn. The spermatozoa passed from the vagina, *a*, direct to cavity of rudimentary horn, *r h*, where impregnation occurred.

FIG. 3.



Ovule travelled from ovary, X, through Fallopian tube, e f, to cavity of rudimentary horn, g. The spermatozoa passed from vagina, a, to cavity of uterus, b, thence through Fallopian tube, c d, to peritoneal cavity, entering cavity of rudimentary horn, g, through Fallopian tube, e f.

removal. Hirigogen's case illustrates this complication beautifully. He found a small hole at the upper angle of the uterine cavity through which he could barely pass his finger. Into this the cord passed to the placenta within. Most dexterous attempts at removal were thwarted by the contractions of the uterus closing the small opening. In spite of the serious bleeding coming from this source, he was compelled to leave the expulsion of the secundines to nature, which had a fortunate termination. Such cases as this have been mistaken for tubal pregnancy with escape of fœtus into the uterus. Such propositions are only made by incompetent observers. The escape of fœtus through the normal tubal orifice is a physical impossibility. Only in cases of imperfect development of one horn continuing into the tube, infundibuliform, can placental tissue grow through from one to the other. The fœtus would slip or move in the direction of least resistance, or the thin wall sac (tube). Thus, if the pregnancy occurred at the junction of tube and uterus, the elastic pressure would force the fluid ball or fœtal sac into the Fallopian tube. If it occurred on the uterine side, it would have a tendency to grow into the uterus. In that case it would not be an escape from the tube to the uterus, but a normal pregnancy. The location of the placenta must have some influence in directing the movement of the fœtal sac in such cases, but in the normal uterus the tubouterine opening is not large enough to permit the development of placental tissue. Pressure of the uterine walls would destroy the villi before they could grow sufficiently to affect the embryo, nor can the villi disturb the normal relation of the uterus and tube. In normal cases the Fallopian tube cannot contract with power enough to overcome the resistance of the uterine tissue and dilate sufficiently to force ovum through it. If it was possible, the necessarily violent contractions would destroy the life of the embryo and terminate the pregnancy, consequently the so-called escape of the fœtus into uterus with placenta retained in tube is a hoax. They are impregnated rudimentary horns with the fœtus growing through the large communication into the opposite horn.

I saw in consultation the wife of a physician whose case was similar to Hirigogen's, but not so decided. The left cornua formed a small pit from which a portion of the placenta had not been removed. Saprophytic infection was intense, and the woman barely escaped with her life. The condition was such that anyone not on the lookout for anomalies might easily have fallen into the same misfortune as the physician attending the case.

The differential diagnosis from tubal pregnancy is difficult except in favorable cases. When the pregnant horn is pedunculated there is greater mobility of the sac. The uterine sound can be passed to differentiate when the pedicle or cervix is patulous, but it is a dangerous practice. The formation of clots in Douglas' pouch indicate tubal pregnancy, for hemorrhage from the other source is too severe to permit clotting before death supervenes. The chief diagnostic features must depend upon the objective signs. Exceptionally the bifid uterus can be felt through the abdominal walls with sufficient distinctness to make a diagnosis.

Most cases have passed unnoticed until after abortion or death, or were discovered on the operating-table.

After the fourth month the pregnant horn becomes spindle-shaped, rises high in the pelvis, and finally above its inlet; is directed obliquely upward and outward, with few exceptions, and possesses the feel of a pregnant uterus. Contractions of uterus or pregnant horn are not reliable, especially in pedunculated cases; there is not enough muscular tissue to respond actively to gentle stimulation, such as rubbing or kneading. The continuance of life a reasonable time after rupture excludes uterus bicornis, and indicates tubal pregnancy. Infection and peritonitis without rupture (though exceptional) are more apt to occur than in the tubal form of ectopics.

Tubal pregnancies usually give a history of sterility. Cornual pregnancies occur for the most part in young married women or in early married life. This with the fact that bleeding or hemorrhage takes place with severity, more often in the latter, are the more important of the subjective signs.

The treatment will call for as many features as there are varieties of deformities. Uterus septus will probably not be recognized until after the second stage of labor, then retention of secundines or post-partum hemorrhage will very likely be the means of its discovery. In an abortion of three months where hemorrhage persisted after evacuation of the uterus and firm uterine contractions, it became necessary to remove the septum. My object in this was to cut back to firm uterine tissue possessed of contractility sufficient to occlude the bleeding-points. In this instance it was successful, but I cannot say what effect a similar procedure will have in uterus at or near term. If the ordinary remedies for post-partum hemorrhage fail, it may be tried, provided the patient is not already exsanguinated. However, it can be no little task even for skilful hands.

Forceps deliveries occurred in only a small percentage of cases, and were attended with very unfavorable results. Turning was relatively frequent in comparison to normal uterus cases. Eclampsia was mentioned only once.

In abortions, evacuation of pedunculated horn or removal of imprisoned placenta is extremely difficult. Not infrequently the pedicle or neck will only admit the finger, and contract so firmly and frequently that dilatation without an anæsthetic is impossible. Here the anæsthetic is imperative. When dilatation cannot be effected the fœtus, up to three and a half or four months, and placenta should be crushed or churned into a pulpy mass with the finger and squeezed out as so many clots. Ideal treatment, when seen early, is the removal of the impregnated horn, as it not only relieves the existing difficulty, but is preventive of future trouble.

Retention of fœtus is rare and in its demands does not differ from ordinary ectopic pregnancy, but is not devoid of hazard in its removal. The patient is safer without the dead fœtus.

All divisions or septa in vagina should be removed as obstructions causing liability to retraction, thinning of the uterus, and rupture. It is best done in the early months or non-impregnated state, on account of sepsis if delayed until labor sets in.

CASES OF PREGNANCY

No.	Name	Bibliography.	Age	Side preg-nant.	Decidua.	Pain.	Period gestation.	Rup-ture.
1	MacDonald, A.	Obst. Trans., Edin., 1884-85, vol. x. p. 70.	23	Left	Some bloody discharge; a lump, said to be a bit of conception. Menstr'tion irregular.	Gradually subsided after cessation of flow.	Fœtus retained 12 mos. after death.	No rupture.
2	Litzman,	Rept. by Werth in Arch. Gyn., Bd. xvii. S. 281.	39	Right	Bloody discharge.	Pain.	Fœtus retained 12 mos. when seen.	No rupture.
3	Turner,	Reported by Macdonald, 1866.	...	Left	.....	.....	Fœtus retained 15 mos.	No rupture.
4	Salin, M.	Stockholm Central. f. Gyn., No. 9. 1881.	23	.....	Bleeding 8 days after expected confinem't; recurrred in April.	Cramping in May.	Fœtus retained 15 mos.	No rupture.
5	Mundé, P. F.	Amer. Journ. Obst. 1887, vol. xx. p. 168.	...	Right	.....	For a week.	5 mos.	No rupture.
6	McLean,	Discus. of Mundé's paper reported a similar case.	...	.....	.....	.....	.....	No rupture.
7	Wylie,	Discussing Mundé's paper.	...	.....	.....	.....	.....	No rupture.
8	Ratcliffe, J. R.	Trans. Obst. Soc., London, 1882, 1893, vol. xxxiv. p. 469-472.	30	Fœtus in left	In rt. horn: menstr'tion regular.	.....	Between 2d and 3d months.	No rupture.
9	Pope, C. H.	Trans. Obst. Soc., London, 1886-1887, vol. xxviii. p. 70.	27	Left	Bloody discharge fr'm vagina and rectum; decidua in uterus adherent only to fundus.	Pain in back and left side; recurred & became violent in abdom'n.	3 mos. when seen.	No rupture.
10	Barry, P. J.	Trans. Roy. Acad. Med., Dublin, Ireland, 1897, vol. xv. pp. 332-337.	23	Left	Menstr'tion irregular and painful.	.....	.....	No rupture.
11	Stoll, Karl	Zeitsch. f. Geburts. u. Gynakol., 1892, vol. xxiv. pp. 275, 285.	24	Right	Bleeding 13 days duration; large blood-clot discharged.	Pain.	3 mos. on admission.	No rupture.
12	Weiner, M.	Arch. f. Gynakol., vol. xxiv. pp. 234-275, Breslau.	29	Right	Painful menstr'tion lasting ten days; bloody discharge lasting 3 wks.	Pain in abdom'n.	Fœtus retained 12 mos.	No rupture.

IN UTERUS BICORNIS.

Bifurcation	Confinements.	Operation.	Result.	Remarks.
.....	1(form'r), last operated on.	Hysterectomy.	Recovery.	Tumor connected to uterus by pedicle, resembling a cervix; sac contained a macerated fœtus; walls of sac variable in thickness; communication through pedicle with uterus.
.....	2(form'r), last operated on.	Laparot., extirpation of sac; died of infection 2 days after operation.	Death.	Tumor size of 8 months' pregnancy. Diagnosis: retention of putrid fœtus.
.....	1 preg., died undeliver'd.	.....	Death.	Died 6 months after expected confinement. Post mort. showed fœtus in left horn; no channel between uterine horn and cavity; specimen sent to Sir James Simpson for examination.
High up.	1 preg., operated upon.	Removal of pregnant horn in June.	Recovery.	Abdominal tumors diminished in size since February.
Uterus septus.	2 misc., 5 & 7 mo., last preg. 5 mos.	.....	Recovery.	Child born in 6th month, but died in one hour; uterine contractions; placenta removed with difficulty.
.....	1	.....	.....	
Uterus diadelphys 2 cervices.	2, both in left side.	.....	.....	Laceration of cervix.
Low down	2, autopsy on last.	.....	Death from accident.	Post mort. revealed corpus luteum on opposite side from pregnancy; cervix about $\frac{1}{4}$ in. deep; vagina had median raphe at upper extremity, but not united.
.....	1, former (7 mos.); last pregnancy peritonitis.	.....	Death.	Threatened abortion, subsided in 3 weeks; purulent peritonitis; gestation sac on left connected by pedicle with uterus, $1\frac{1}{2}$ inch long (pedicle); walls of sac formed chiefly of fœtal membranes; no communication between cyst and uterus through pedicle.
Low, presumably.	1, operated on.	Abdominal section, left preg. horn removed, pedicle tied and stitched.	Recovery.	Two abdominal tumors, right one regarded as fibroid, the left as pregnancy; left side tumor continuous with cervix. Subsequent examination, tumor on right looked like pregnancy, that on the left, like pregnancy in uterus bicornis; fœtal heart heard later; pus formed in right horn, after operation, was aspirated.
.....	1, abort'd since.	.....	Recovery.	Mass on left side connected with cervix; cyst-like swelling, on right side, size of goose egg; tumor moved with uterus. Made diagnosis of extra-uterine pregnancy; on sounding, diagnosis changed to pregnant right horn—uterus bicornis. Abortion soon followed.
.....	1, former, last operated on.	Abd. sec., excis. preg. horn, bluish tum. resem. myoma slightly adherent to abd. wall, right side.	Death of fœtus; mother recovered.	Came under observation December 5th.

No.	Name.	Bibliography.	Age	Side pregnant.	Decidua.	Pain.	Period gestation.	Rupture.
13	Weil, Jos.	Centralbl. f. Gyn., Nov. 14, 1896.	26	Left	Some discharge.	Some pain; pain and collapse.	.....	Rupt. at term.
14	Rosenburger	Monatsch. f. Geburrtskunde, 1862. vol. xix-xx. p. 186.	24	Right	Menses absent 4 mos.	Abdominal pain.	5 mos. fœtus.	Rupture.
15	Sell, E. H. M.	Trans. Obst. Soc., London, 1873-1874, vol xv. p. 180.	31	Right	Decomp's'd membrane in tumor, decidua.	.....	9 mos. when seen.	No rupture.
16	Bourrus, J.	Bordeaux Thèsis, 1890-1891, 14-26, No. 19, p. 65.	22	Right	.....	.....	3 mos. when examined.	No rupture.
17	Blume, F.	Amer. Gyn. and Pediat., Boston, 1898-1899, vol. xii. p. 83.	26	Left	.....	Pain at menstruation.	Full term	No rupture.
18	Broom, G.W.	Weekly Med. Rev., St. Louis, 1891, vol. xxiii. pp. 321-324.	...	Left	Hemorrhage.	.....	3 mos. at first examinat'n; del'd full term.	No rupture.
19	Biehl, Karl	Mittheil de Veriens der Aerzte in Steirmark Groz., 1893. No. 4, p. 103.	...	.....	....	.....	Not pregnant.	.....
20	Carrier,	Annals Gyn. and Pediat., Philada., Sajous' An., 1891.	...	.....	.....	.....	Not pregnant.	.....
21	Litchkous,	Annals Gyn. and Obst., Paris, Sajous' An., 1895,	...	.....	Expelled.	.....	At term.	No rupture.
	Litchkous,	" " "			Decidua & placenta expelled.	.....	At term.	No rupture.
22	Fayne, F. C.	Norsk. Mag. f. Largemdenskaben, Christiana, 1861-62, vol. xv. pp. 593-613.	39½	.....	.....	.....	At term.	No rupture.
23	Gibson, N. J.	Canada Journ. Med. and Surg., Toronto, 1898, vol. iv. p 351.	...	Left	Bleeding periodical, shreddy.	Pain severe and almost constant.	3 mos. presumably.	No rupture.
24	Hirigogen,	Rev. Obst. et Gyn, Paris, 1891, vol. vii. pp. 133-136.	20	.....	Hemorrhage considerable.	Pain after seventh month.	At term.	No rupture.

Bifurcation	Confinements.	Operation.	Result.	Remarks.
High up.	1, previous delivery (8 mos., 1 abort. (8 wks.), 1 full term (d.)	.....	Death in 3 hours.	Post mort., uterus bicornis. In 1894 delivered of 8 months' fœtus which lived a few weeks, two webbed fingers; another pregnancy, 1895; extreme anæmia in two hours; rupture occurred before labor set in.
.....	1	.....	Death.	Rudimentary horn. Diagnosis, tubal pregnancy. Post. mort., considerable blood in abdominal cavity; blood came from placenta; uterus not much developed; accessory horn connected by muscular band.
Medium.	1 birth(?) abortion 6 mos.	.....	Recovery.	Extraction of fœtus difficult; placenta extracted manually, uterus could not expel it.
At fundus.	1	.....	Recovery.	Uterus bicornate; version attempted a number of times, but failed on account of right horn grasping fœtus; delivered spontaneously at term without trouble.
At junct'n of neck and body of uterus; vagina double.	2	.....	Recovery.	Tumor spindle, gave impression of fibroid; labor normal; again delivered ten months later.
.....	1	.....	Recovery.	Resembled ectopic; delivery uneventful; subsequent laparotomy disclosed bicornate uterus.
.....	2 normal.	.....	.....	Post mort. revealed uterus bicornis unicollis. Died, carcinoma uteri.
.....	5 normal.	.....	Recovery.	During laparotomy for removal of appendages discovered uterus bicornis unicollis. Had been delivered five times.
.....	4 deliv'd spontaneously.	.....	.....	First case, pregnancy unicornis bicollis.
.....	1	.....	.....	Second case, expulsion of placenta led to diagnosis.
.....	2	.....	Died in last c'nfinement 28 days after.	Uterus duplex bicornis; turning in both confinements; right uterus normal with tumor; left uterus more cylindrical; fibrous tumor near left ovary.
Above neck.	1 miscarriage.	Explorat'y incision.	Recovery.	Uterus bicornate, mistaken for ectopic; appendages normal; miscarried eighth day after operation.
.....	2	.....	Mother recovered, first child lived.	First confinement, hemorrhage following delivery at term; delivered again one year later; severe and almost constant pain from 7th mo.; fœtus delivered dead; placenta found in prolongation of right horn, which formed a sort of pocket, separated from the general uterine cavity by a band of circular muscular fibres through which passed the umbilical cord and membranes; impossible to push finger into this cavity. Condition grave from loss of blood; stimulated, reacted; pains returned and expelled placenta; septic condition for ten days. During involution it was noticed that a tumor remained over the right cornu which disappeared when uterus returned to normal size.

No.	Name.	Bibliography.	Age	Side pregnant.	Decidua.	Pain.	Period gestation.	Rupture.
[illegible]	Kaltenbach,	Weiner Med. Blatt., Dec., 1882.	...	Right	.....	.....	4 mos.	Rupt. by violence.
26	Kleinwachter,	Zeitschr. f. Geburtskunde and Gyn., 1893, vol. xxiv. pp. 144-152.	31	Left	Metrorrhagia fr'm 6th week; decidua.	Pain continuous from beginning.	3½ mos. 1st abortion.	No rupture.
27	Mangiagialli	Atti. della Assoc. Med., Lombarda, Milano, 1891, pt. 2, 39-41, 1 pl.	19	.....	Bleeding; expulsion in May.	.....	Not mentioned.	No rupture.
28	Mangiagialli	Abst. from Atti. della Assoc. Med., Lombarda, No. 1, p. 29.	...	.....	.....	.....	Not mentioned.	Not mentioned.
29	Mundé, P. F.	Amer. Journ. Obst., 1890, New York, vol. xxiii. pp. 23-25.	...	Right	Passed.	Much pain in tumor.	Not mentioned.	No rupture.
30	Hochstetter,	Charité Annalen, Berl., 1894, vol. xix. p. 538.	23	.....	.....	.....	At term.	.....
31	Chapin, W. B.	New York Med. Journ., 1890, vol. vol. lii. p. 352	28	.....	.....	Several days.	4 mos.	.....
32	Weist, J. R.	Amer. Practitioner, 1883, vol. xxvii. p. 129.	28	Left	.....	Menstr. always painful.	At term.	.....
33	Lane, E. W.	Atlanta Med. and Surg. Journ., 1885, p. 275.	30	Both	.....	.....	Term.	.....
34	Donald, A.	Brit. Med. Journ., 1888, i. p. 1267.	28	.....	Metrorrhagia; menses during pregnancy.	Lower abdomen.	4 mos.	.....
35	Doge, L. P.	Northwest. Lancet, 1890, vol. x. p. 325.	37	Left	Menstr't'n every 4 wks from unimpregnated uterus, at times excessive.	.....	.....	.....
36	Tombleson,	London Lancet, July 31, 1897, p. 253.	...	.....	.....	.....	7 mos.	.....
37	Giglio, G.	La Riforma Medica, 1892, vol. ii. p. 185.	25	.....	.....	.....	3 mos.	.....
38	Leuf, A. H. P.	Med. News, 1893, vol. lxxii. p. 490.	18	.....	.....	.....	6 weeks both times.	.....
39	Arnold, E. G. E.	London Lancet, 1895, vol. i. p. 988.	22	.....	.....	.....	1 term.	.....
40	Houser, J. A.	Med. Brief, St. Louis, 1896, p. 1330.	23	.....	.....	.....	Pregnant 4 times, lost all.	.....
41	Truzzi, Ettore	La Clin. Moderna, 1896, p. 181.	40	.....	.....	Menstr. painful.	3 at term, 1 at 7 mos	.....

Bifurcation	Confinements.	Operation.	Result.	Remarks.
Internal os.	4, last ruptured.	.....	Death.	Uterus bicornis. Ill-treated by husband; died few days later; symptoms of internal hemorrhage; uterus ruptured; gestation sac attached by solid cord; tube and ovary and corpus luteum in posterior part of sac.
Near fundus.	2d & 4th abort'ns; sound in 1st.	.....	Recovery.	Suspected ectopic; pain and bleeding until June; abortion; tumor on left side disappeared. A year later pregnant again in left horn; aborted. First abortion was produced by sounding the uterus. Considerable increase in the size of left horn after both abortions.
.....	Nullip., 1st operated on.	Laparot., Oct. 31, 1891, removed impervious preg. horn.	Recovery.	Uterus bicornis; mummified fœtus.
Low presumably.	...	Laparot., removal of preg. horn.	.....	Retention of mummified fœtus.
....	1, & this, an abortion.	Abd. sec., uterus appeared to be normal; uterus aspirated; patient aborted.	Recovery.	Mistaken for tubal pregnancy; subsequent examination proved uterus septus.
Uterus and vagina duplex.	1	Forceps deliv ry.	Death 3d day.	Eclampsia requiring forceps; the two wounds entirely separate.
Uterus septus.	2	.....	Recovery.	Ovum one side, placenta in other; six months later miscarried; fœtus in opposite side.
Uterus and vagina duplex.	1	Forceps.	Recovery.	Vaginal septum obstructed labor.
Double uterus.	1	.....	Rec'ry; babies died.	Twins, one on each side. Tedious labor.
Uterus duplex; vagina septus.	...	.....	Recovery.	
Uterus and vagina duplex.	1	.....	Recovery.	
Bifid (two horns), sulcus in fundus observed before delivery.	3	.....	Recovery.	Three confinements, all premature. Twins suspected each time.
Uterus duplex; vagina septus.	1	.....	Recovery.	
Uterus bicornis.	2	.....	Recovery.	
Uterus bicornis at internal os.	1	.....	Recovery.	Shoulder presentation; version; fœtus in one side, placenta in the other.
.....	4	.....	Recovery.	Pregnant on right side first, next time on left side, third time both sides, and last time not mentioned.
Uterus bicornis; vagina duplex.	4	.....	.....	Version one time, 2d tedious, 3d miscarriage, 4th normal; puerperal fever in all except last.

No.	Name.	Bibliography.	Age	Side preg-nant	Decidua.	Pain.	Period gestation.	Rup-ture.
42	Kendall, F. D.	Ga. Journ. of Med. and Surg., 1898. p. 73.	22	.....	.....	.....	2 term.	.....
43	Purvost,	.....	...	Both sides	Expulsion of shreds from unim-preg. uterus in 2d & 3d labors.	.....	4 term.	.....
44	Dromellard,	Woman's Med. Journ., 1898, p. 73.	35	.....	.....	.....	5 term, 7 abort'ns	.....
45	Edge, F.	.....	34	.....	.....	Menstr. always painful.	1 term, 1 abort'n.	.....
46	Elbing,	St. Petersburger Medizin. Wochen., 1890, p. 299.	...	.....	.....	Burning pain left side after delivery.	2 term.	.....
47	Handfield,	Centralb. f. Gynak., 1883, p. 538.	...	Left	.....	.....	1 term.	.....
48	Schütz,	Archiv. f. Gynak., vol. vii p. 293.	...	Right	.....	.....	1 term.	.....
49	Schütz,	" " "	...	Right	.....	.....	1 term.	.....
50	Winter,	Centralb. f. Gynak., 1887, p. 314.	...	Left	.....	.....	.....	.....
51	Grinew,	Med. Bericht St. Petersburger Geb-anstald, 1880.	...	.....	.....	.....	Term 4 times.	.....
52	Ruge, C. (case of Simons).	Zeitschr. f. Geburt-shülfe und Gynak., vol. vii. p. 27.	...	Right	.....	.....	3 mos.	Rupt., death from hemor-rhage.
53	Serejnikoff, S.	St. Petersburger Monats. f. Geburt-shülfe und Gynak., vol. viii. No. 3, p. 232.	...	.....	Decidua in empty horn felt by finger.	.....	8 mos.	Rupt. 8 mos., no hemor-rhage.
54	Gardini, P. L.	Annali d. Obst. e. Gin., Sept., 1899.	...	.....	.....	.....	1 term, 2 aborts.	.....
55	Rossa,	Wiener klin. Woch., 1892, vol. v. p. 501.	24	Right	Decidua thrown off from left uterus.	.....	7 mos.	.....
56	Knouss, K.	Med. Corresp. Blatt. d. Wurzt. Aerzt., 1894, vol. xiv. p. 33.	31	Right	.....	.....	2 term.	.....
57	Netzel, W.	Centralb. f. Geburt-shülfe und Gynak., 1886, No. 27, p. 439.	23	Right	.....	.....	12 mos., macer'd fœtus.	.....
58	Kiderlen, F.	Zeitsch. f. Geburt-shülfe u. Gynak., vol. xvi. p. 19	27	Left	Menses at times pain-ful; decidual membranes removed by curette; menstru-ated 5 mos. after preg-nancy.	Abdomi-nal four months.	1 abort. 1 term, 1 6 mos.	.....
59	Kiderlen, F.	" " "	35	Left	.....	.....	5 term, 5 aborts.	.....

Bifurcation	Confinements.	Operation.	Result.	Remarks.
Uterus septus; os double.	2	.....	Recovery.	
Uterus duplex.	4	1st labor long and tedious, 2d labor normal.	.....	
Uterus bicornis.	12	.....	Recovery.	
Uterus septus (complete).	2	.....	Recovery.	
Connected by *band* (pedicle).	2	.....	Recovery.	Lithopedion carried 1½ years after its death; first pregnancy, one fœtus delivered, the second lithopedion.
Uterus bicornis	1	.....	Recovery.	Normal labor.
Uterus bicornis	1	.....	Recovery.	Normal labor.
Uterus bicornis	1	.....	Recovery.	Normal labor.
Uterus bicornis	1	.....	Death.	Horn inverted and lacerated from fundus to internal os. Specimen secured after death, which occurred third week of puerperium.
Uterus bicornis; bifurcation internal os.	4 twins	.....	.....	Delivered four times of twins.
By pedicle (*solid*) at internal os.	...	.....	Died.	Corpus luteum on left side, none on right; right pedicle solid.
By pedicle, supposed to be solid; bifurcation above internal os.	...	.....	Recovery.	Right horn developed in folds of broad ligament, no tube attached to right horn (migration). Ruptured through thin portion of sac, no hemorrhage.
Double uterus and vagina.	3	....	Recovery.	Double uterus and vagina; fœtus ruptured uterine septum, vaginal septum cut away.
Uterus duplex; vagina duplex.	2	Vaginal septum cut away.	.....	Placenta expressed, both confinements premature.
Uterus bicornis, vagina duplex.	2	.....	.....	
Bicornis uterus; right horn pedicle occluded.	1	Laparot., enucleat'n right horn.	Recovery.	Corpus luteum left ovary.
Uterus bicornis, above internal os.	3	.....	.....	
Uterus bicornis, above cervix.	10	.....	.....	

No.	Name.	Bibliography.	Age	Side preg-nant.	Decidua.	Pain.	Period gestation.	Rup-ture.
60	Landon,	Centralbl. f. Gynak. und Geburtshülfe, No. 27, p. 298.	23	.....	.....	Painful 3 years.	.....	.....
61	Winter,	Ibid., 1892, p. 363.	25	Left	....	.....	1 term.	Rupt. 5 mos. saccu-lation.
62	Winter,	" " "	...	.....	.....	.....	3 mos.	.....
63	Benike, F.	Zeitsch. f. Geburt-shülfe u. Gynak., vol. vi. p. 366.	28	Left	....	.....	1 term.	....
64	Dittel, E. v.	Centralbl. f Gyn., Leipzig, 1894, vol. xvi. p. 610.	...	.....	....	.....	1 prema-ture.	.....
65	Sanger,	Centralbl. f. Gyn. und Geburtshülfe, 1883, p. 324.	...	Left	....	.....	2 term, 1 7 mos. at opera-tion.	.....
66	Swift,	Zeitsch. f. Aerzt. Laveproxis, 1893, vol. ix. p. 313.	31	.....	.....	.....	3½ mos.	.....
67	Hollander, E.	Berl. klin. Woch., 1894, vol. xxxi. p. 402.	33	Anter'r uterus	.....	.....	.....	.....
68	Canistrini,	After Kussmaul.	...	Right	.....	.....	.....	In 4th month.
69	Pfeffinger,	" "	...	Left	.....	.....	Fœtus 30 years in uterine horn.	In 6th month.
70	Tideman Czyahak,	" "	...	Right	.....	.....	.....	In 5th month.
71	Dreyer,	" "	..	Right	.....	.....	.....	In 4th month.
72	Ingleby,	" "	...	Left	.....	.....	.....	In 4th month.
73	Herzfelder,	" "	...	Left	.....	.....	.....	In 14th week.
74	Rokitansky,	Handb. der Path. Anat., vol. iii.	...	Right	.....	.....	.....	.....
75	Scanzoni,	After Kussmaul.	...	Left	.....	.....	.....	Betw'n 4th and 5th mo.
76	Behse,	" "	...	Right	.....	.....	.....	Betw'n 5th and 6th mo.
77	Dionis,	" "	...	Right	.....	.....	.....	.....
78	Moldenhauer	Arch. f. Gyn., vol. vii. p. 175.	...	Right	.....	.....	.....	.....
79	Chiari,	Wien. med. Woch., 1876, No. 24.	...	Left	.....	.....	.....	.....
80	Chaussier,	After Kussmaul.	...	Right	.....	.....	.....	.....
81	Turner,	Edinburgh Med. Journal, 1866.	...	Left	.....	.....	.....	.....
82	Turner,	Ibid.	...	Left	.....	.....	.....	.....
83	Virchow,	Monat. f. Geburts-kunde, 1860.	...	Left	.....	.....	.....	Rup-ture.
84	Luschka,	Ibid., 1863.	...	Right	.....	.....	.....	Rup-ture.
85	Rosenburger	Ibid., Bd. xix.	...	Right	.....	.....	.....	Rup-ture.

Bifurcation	Confinements.	Operation	Result.	Remarks.
Uterus bicornis, pedicle solid, connected ab. cervix	...	Laparot., extirpation preg. horn.	.....	Migration.
Uterus bicornis, bifurcation ab. cervix, rudimentary horn, solid ped.	1	Laparot., 1 wk. after rupture.	.....	Rupture and sacculation by agglutination of intestines and false membrane. Dead fœtus. Corpus luteum in ovary of opposite side.
Uterus bicornis, solid pedicle.	...	.....	.....	Maceration fœtus.
Uterus diadelphys, vagina duplex.	1	Forceps used, followed by hemorrh'ge	Recovery.	
Uterus diadelphys, vagina duplex.	1	.....	Recovery.	Uteri widely separated.
Uterus duplex.	2	Laparot., & removal of pregnant horn.	Recovery.	Corpus luteum on opposite side.
Uterus bicornis.	1	.....	Death.	Aborted with hemorrhage; mistaken for tumor, had prepared to operate, punctured with trocar and evacuated fluid, abortion followed. Death from sepsis.
Uter's bifid ant.-post.; no tubes or ovaries to ant. uterus, which was pregnant.	7 confinements, 3 miscarriages.	Explor'tory abdominal incision.	.....	
.....	2 normal.	.....	.....	Pregnant horn connected by solid pedicle.
.....	...	.....	.....	Pregnant horn connected by solid horn to uterus
.....	...	.....	.....	
.....	...	.....	.....	
.....	...	.....	.....	
.....	...	.....	.....	Connected by hollow muscular pedicle.
.....	...	.....	.....	Joined by hollow pedicle.
.....	...	.....	.....	Connected by hollow pedicle.
.....	...	.....	.....	
.....	...	.....	.....	Two ureters present (probably on one side).
.....	...	.....	.....	
.....	...	.....	.....	
.....	11, twins once.	.....	.....	Defective left kidney; entire defective left horn.
.....	...	.....	.....	Pedicle solid, then hollow; rupture of uterus.
.....	...	.....	.....	
.....	...	.....	.....	Connected by solid cord, increasing toward ampulla.
.....	...	.....	.....	Right, cord-like, solid horn, increasing toward ampulla.
.....	...	.....	.....	Right, cord-like, solid horn, increasing toward ampulla.

No.	Name.	Bibliography.	Age	Side pregnant.	Decidua.	Pain.	Period gestation.	Rupture.
86	Day,	After Furst.	...	Left	.....	.....	.....	Rupture.
87	Stotz,	" "	...	Left	.....	.....	.....	.....
88	Katenbach,	Arch. f. Gyn., 1883, p. 172.	...	Left	.....	.....	.....	.....
89	Forster,	Atlas.	...	Right	.....	.....	.....	Rupture.
90	Jorg Gunz,	After Kussmaul.	...	Right	.....	.....	.....	In 6th month.
91	Sprenzel,	Deutschklinik, 1860.	...	Left	.....	.....	.....	.....
92	Teller, S.	Amer. Journ. Obst., New York, 1884, vol. xvii. pp. 142–144.	35	Both (twins) left	.....	.....	Full term	No rupture.
93	Saxinger,	Inaug. Abhandl., Tubingen, 1874.	...	.....	.....	.....	.....	.....
94	Wenzel, G.	Inaug. Dissert., Berlin, 1868	29	Fœtus left, pl'c'nta right.	Menstr't'n regular.	.....	Full term	No rupture.
95	Weichers, Edw.	Inaug. Dissert., Gottingen, 1879.	27	Left	Menstr't'n regular.	.....	Full term	.....
96	Tate, W. H.	St. Thomas Hosp. Rep., 1894, n. s., pp. 22–43–49.	40	Right	Menstr't'n regular; decidua escaping; periodical discharge of blood.	No pain with menstr.; bearing down pain in back and abdomen.	5 mos.	No rupture.
97	.....	Rep. N. York Med. Journ., 1890, vol. liv. p. 352	24	.....	.....	Pain at 4th mo.	4 mos.	No rupture.
98	Blodgett, A. N.	Boston Med. and Surg. Journ., 1874, vol. xc. p. 328.	31	Right	Typical.	.....	.....	No rupture.
99	Noble, Geo. H.	Atlanta, Ga., 1892 (this paper).	24	Left	.....	Cramp'g frequent after 3 mos.	5 mos.	No rupture.
100	Noble, Geo. H.	Same case, one year later.	...	Left	.....	Cramp'g after 8th mo.	At term.	No rupture.
101	Noble, Geo. H.	Atlanta, Ga., 1890 (this paper).	34	Left	.....	.....	Full term	No rupture.
102	Noble, Geo. H.	Atlanta, Ga., 1898.	20	Right	.....	Severe cramping pains after 5th month.	.....	No rupture.

Bifurcation	Confinements.	Operation.	Result.	Remarks.
.....	...	.....	.....	
.....	...	.....	.....	Defective left kidney.
.....	...	.....	.....	Connected by hollow cord.
.....	...	.....	.....	
.....	...	.....	.....	
.....	3	.....	.....	
High.	9	.....	Recovery.	Eighth confinement was twins, one in each horn, one transverse, one lived, one died. Second confinement, part of placenta was left, and had to be removed by physician; afterward delivered spontaneously; uterus septus. Fifth, seventh, and ninth were transverse presentations.
.....	..	.....	.....	No pregnancy in this case; menstruation did not take place from both sides at same time; uterus bicornis, with pyometra and pyocolpus.
Above internal os; uterus septus.	1, former (living).	1 delivered with instruments.	Death.	Uterus bicornis; configuration of abdomen aided diagnosis; breech; death third day from peritonitis.
.....	Version; child died.	.....	Died.	Present trouble, foul-smelling discharge at menstruation; death from pyæmia. Post mort.: purulent fluid in abdomen; uterus bicornis; right horn largest, no communication between the two uteri; abscess cavity found in communication with right horn.
High up; uterus septus.	9 former, 1 preg. aborted at 5 mos. (sound used).	.....	Mother recovered.	Sulcus between the two horns; uterus sounded, resulting in expulsion of 5 months' fœtus, with placenta.
Uterus septus.	Primipara, 2 abortions.	Usual treatment to induce abortion not successful.	Recovery. ?	Uterus septus with single body, separated by wedge-shaped septum; 29 days after delivery a 6 months' fœtus was born from the cavity supposed to be unimpregnated.
Above internal os.	2 previous miscarriages, 1 full term.	Version was performed.	Recovery.	Douglas' pouch was filled with a tumor which felt like a mass of fecal matter in the rectum, but examination proved the rectum empty; tumor movable, felt smooth and somewhat softer than a fibroid; the parts were not painful. Examination showed the tumor in Douglas' space to be the unoccupied horn of a bicornate uterus. The walls of the left horn were thickened and soft, but contained nothing but soft tissue; the deformity of the pelvis consisted of a conjugate diameter of only 2½ in. Forceps could not be applied; child was profoundly asphyxiated, but was restored.
Double uterus and vagina.	1 miscarriage.	Previously dilated and curetted for dysmenorrhœa.	Recovery.	
.....	1 at term.	Cutting through vag. sept'm to overcome obstruction produced by it.	Recovery.	Subsequently died of embolism (pulmonary) rheumatic endocarditis.
Double uterus; cervix to each uterus.	4	.....	Recovery.	Four normal labors.
Bicornis bifurcation just above internal os.	1	.....	Recovery.	Placenta in left horn, extending through into the Fallopian tube; removal extremely difficult.

TUMORS OF THE MASSETER, WITH SPECIAL REFERENCE TO SARCOMA.

By Felix A. Larue, M.D.,
New Orleans, La.

The study of tumors is one of the most important and interesting in the wide field of clinical surgery. The frequency and more especially the nature of these growths tax to the utmost the practitioner's good judgment, tact, and surgical skill.

We are all familiar with the appalling and apparently steadily increasing statistics of tumors in all parts of the world, with special reference to those of a malignant type. There seems to be, as it were, a general diffusion of this infection with which we are as yet so powerless to cope.

With these preliminary remarks, it is quickly conceded that the two following essential points are to be ever present in the surgeon's mind: 1. The diagnosis of the tumor. 2. The treatment to be applied. By diagnosis of the tumor we understand that the correct nature of the growth should be determined by clinical experience, with the aid of the laboratory.

The treatment can be resolved into three points: 1. Palliative. 2. Prophylactic. 3. Radical.

It is, we must admit, very difficult at times to positively assert the exact nature of a tumor simply from the clinical evidence. I cannot help mentioning a personal recollection of a most instructive and purely clinical tilt between the late Dr. Péan and Prof. Fournier at the St. Louis Hospital in Paris. The disputed case was that of a patient with an ulcerated growth of the thigh, diagnosed by the late distinguished sur-

geon as cancer, and by the other equally world-renowned syphilographer a gumma.

When we are confronted with a patient bearing a tumor, and we are doubtful as to its real nature, we should in every instance strongly advise its removal.

Two reasons above all should guide us in this determination: 1. The malignant effect of traumatism on benign tumors. 2. The hereditary predisposition to malignant changes in benign tumors.

In hospital practice, composed mostly of the hard-working class who are necessarily exposed to the constant danger of traumatism, the first point can be strongly advocated. We should, generally speaking, use our beneficent influence toward the removal of benign tumors, and especially when dealing with those poor laborers and artisans. The other point of hereditary predisposition to malignant changes is very important in regard to all classes. We know, nevertheless, how so often it is impossible to procure any reliable hereditary history in hospital practice. In private *clientele* this can generally, although not always, be elicited. However, the words tumor, swelling, rising, and growth ought always arouse our suspicions.

Malignant process seldom has its origin in normal muscular tissue—that is, a primary cancerous growth in a muscle is rare; secondary or metastatic deposits are more often met with.

Gummatous infiltration is the most frequent of all primary growths in muscle. We may also find hydatid cysts, hæmatoma, lipoma, fibroma, enchondroma, and sarcoma.

The history of the patient which I will present in this paper led at first to some doubt in my mind as to the true nature of his trouble. Salvatore B. was admitted into Ward 7 of the Charity Hospital of Louisiana on March 26, 1900. He was born in Italy forty-eight years ago, and has been residing in this country for the past two years. His occupation was that of laborer on a sugar plantation.

He stated that his father died of cholera; cause of the deaths of mother and grandparents not given. Brothers and sisters living and in good health. He gives a clear-cut history of

hard chancre, with secondary symptoms, contracted when fifteen years of age. He was given some pills, he asserts, but only took them for a short period.

On admission the patient presented a small tumor on the left side of the face, which he noticed three months previously; it apparently formed part of the masseter muscle.

The mouth being closed, the tumor, the size of a pigeon's egg, is movable laterally, but not otherwise. When the mouth is open it is immovable. It feels slightly nodular over the skin, while with the finger in the mouth it presents a smooth but firm surface. On the left side of nose is also noticed a small warty tumor which had been growing for the past month, frequently giving rise to sharp pains as if someone was pinching him, as he expressed it.

I detected only one or two moderately enlarged glands in the corresponding submaxillary region.

The patient's general condition seemed good, notwithstanding the fact of his having, as he says, spit up altogether about a glassful of blood in eight days during three different hemorrhages. While in the ward nothing of that sort occurred, and examination of the various organs revealed nothing abnormal, excepting a very slight condensation of the apex of the right lung. Urine examination proved negative. Taking his previous history into consideration, I immediately instituted an energetic anti-syphilitic medication.

After three weeks of systematic mercurial friction and full doses of iodide of potassium the tumor seemed to increase in size, and more lymphatic glands were felt in the submaxillary region.

I then concluded that the best course to pursue was to extirpate the tumor on the nose and the one in the masseter.

So on April 11th, after a preliminary hypodermatic injection of morphine sulphate, $\frac{1}{4}$ gr.; strychnine sulphate, $\frac{1}{60}$ gr., and digitalin, $\frac{1}{100}$ gr., and under chloroform anæthesia I removed the tumors and the infected lymphatic glands. I made an incision parallel to the lower border of the zygoma, beginning at the malar bone, then vertically downward to the angle of jaw

and then parallel to the lower border of inferior maxilla. I had to extend downward in the neck the vertical cut so as to reach one or two glands deeply hidden. Before the anæsthetic was administered respirations were 18 and pulse 80 per minute. The operation, due to the very delicate dissection to avoid injuring the facial nerve and Steno's duct, lasted longer than otherwise.

After isolating the retracting nerve filaments, and especially Steno's duct, I found a hard mass embedded in the upper border of the masseter muscle; I detached the muscle completely from its origin and insertion, extirpating it *en masse*.

The malar bone was to all appearances not diseased, so I deemed it unnecessary to remove it. Whether it was best policy to limit myself to the removal of the affected muscle, I must admit that the subsequent history of the case will show.

Two ounces of chloroform were given, and at the end of the operation respirations were 14 and pulse 90 per minute, with good volume.

No post-chloroformic vomiting occurred, and on the evening of the operation patient was in good spirits and complained of no discomfort. Subcuticular catgut suture was used to close up the incision of the face, and although slight suppuration took place in two or three spots the temperature remained about normal, and recovery took place very quickly, leaving very slight scar lines.

Dr. O. L. Pothier, pathologist of the Charity Hospital, examined the specimen and sent me the following report of the tumor and glands: Small round-celled sarcoma; lymphatic glands accompanying growth were infiltrated with round cells.

Since the operation I have read in the *Revue de Chirurgie*, May 10, 1900, of the surgical intervention in some cases of sarcoma of muscular origin.

Ollier and others insist that in cases of muscular sarcoma the most radical and wide extirpation should be resorted to—for example, disarticulation of shoulder for sarcoma of biceps.

Chandeleux was inclined to believe that such radical meas-

ures in the aged were not so imperative as in the young subjects, when a prolonged cure should be sought by radical means.

He cited the case of a man, aged sixty-five years, with sarcoma of the flexor sublimis digitorum, on whom he performed a conservative operation. The patient died two years after from cardiac disease without having shown any signs of recurrence.

I am indebted to Mr. Sexton, resident student of the Charity Hospital, for clinical notes taken in the ward.

INDEX.

ABDOMEN, exploration of, as an adjunct to every cœliotomy, 355
gunshot wounds of, 37, 200
Abdominal surgery, some interesting cases of, 154
Acute surgical pneumothorax, relief of, 52
Ameiss, F. C., 244
Anæsthesia, surgical, 307
Annual address of President, 1
Appendicitis, gangrene of intestine simulating, 121
unique case of, 261

BAXTER, GEORGE A., 197
Beef-gall enemata in the treatment of post-operative obstinate constipation and intestinal obstruction, 244
Bilharzia hæmatobia, 270
Biliary calculi, surgery of, 98
Bloom, J. D., 47, 83
Bovée, J. Wesley, 14, 27, 91, 116, 119, 166, 232
Brown, George S., 118, 151, 169, 179
Burthe, L., 335

CARTLEDGE, A. Morgan, 28, 114, 163
Cathcart, R. S., 89, 307
Children, vesical calculi in, 322
Cleft palate, technique of early operation for, 279
Cœliotomy, exploration of abdomen as an adjunct to, 355
Congenital nocturnal incontinence of urine, 210
Crofford, T. J., 87, 129, 135, 200, 208
Cystocele, operation for, 223
Cysts, intraligamentous, 129

DAVIS, JOHN D. S., 196
Davis, W. E. B., 48, 135
Different phases of electric treatment, 251
Diverticulum, œsophageal, 338

Earnest, J. G., 112, 132, 207
Electric treatment, different phases of, 251
Enemata, beef-gall, in the treatment of intestinal obstruction, 244
Excision of shoulder-joint, 329
Experience in operations for typhoid perforations, 137
Exploration of the abdomen as an adjunct to every cœliotomy, 355

Fenner, E. D., 190, 199, 205
Fistula, retrovaginal, 85
Fracture of patella, 292
of skull, 334

Gangrene of intestine simulating appendicitis, 121
Gaston, J. McFadden, 251
Grant, H. H., 37, 50, 127
Gunshot wounds of the abdomen, treatment of, 37, 200

Haggard, W. D., Jr., 90, 98, 120, 150
Hermetic sealing of septic wounds, 235
Hill, R. S., 313
History and methods of intralaryngeal insufflation for the relief of acute surgical pneumothorax, with a description of the latest devices for the purpose, 52

Iliac vein, external, myoma originating in, 28
Immediate hermetic sealing of septic wounds, 235
Incontinence of urine, congenital nocturnal, 210
Inflammation of Meckel's diverticulum, with resulting gangrene of the intestine, simulating appendicitis, 121
Injury, spinal, 190
Intestine, small, perforation of, 200
Intraligamentous cysts, 129

Jacksonian epilepsy, due to unrelieved depressed fracture of the skull, 334
Jelks, James T., 261
Johnson, Joseph Taber, 1, 152, 205
Johnston, George Ben, 88

Kelly, Howard A., 355

Larue, Felix A., 390
Lewis, Ernest S., 164
Litholapaxy, 169

McMurtry, Lewis S., 85, 117, 133, 135
McRae, F. W., 49, 111, 154, 166, 178, 203, 231
Marcy, Henry O., 235
Martin, E. Denegre, 292
Masseter, tumors of, 390
Matas, Rudolph, 52
Meckel's diverticulum, inflammation of, 121
Miller, C. Jeff, 92
Milliken, Samuel E., 26, 46, 150, 166, 188, 231
Myoma originating in the muscular coat of the external iliac vein, 28

Noble, George H., 26, 89, 147, 184, 210, 212, 223, 233, 365
Nicolson, William Perrin, 121, 198

Œsophageal diverticulum, two cases of, 338
Operation for cystocele, 223
Operations for typhoid perforations, 137
Ossification of the uterus, 92

Parham, F. W., 46, 82, 147, 204
Parker, William E., 36, 44, 196, 208
Patella, fracture of, 292
Peritonitis with perforation of small intestine, 200
Perkins, W. M., 299
Pregnancy in uterus bicornis, one hundred and twelve cases of, 365
President, annual address of, 1
Prophylaxis of surgical shock, 298

Relief of acute surgical pneumothorax, 52
Report of a unique case of appendicitis, 261
Retrodislocation of uterus, 313
Retrodisplacement of uterus, treatment of, 180
Retrovaginal fistula, 85
Richardson, Maurice H., 338
Rogers, W. B., 148, 153

Septic wounds, immediate hermetic sealing of, 235
Seventeen years of congenital nocturnal incontinence of urine cured by operation, 210
Shands, A. R., 329
Shoulder-joint, excision of, 329
Simons, Manning, 45, 113, 203
Simple fracture of the patella, 292
Skull, fracture of, 334

Smythe, Frank D., 322
Spinal injury, report of cases of, treated at the Charity Hospital, New Orleans, during 1899, 190
Surgery, abdominal, 154
of biliary calculi, 98
Surgical anæsthesia, 307
shock, prophylaxis of, 298
Suspension of the uterus by intramural shortening of the round ligaments, 212

TAYLOR, HUGH M., 43, 112, 137, 152, 153, 187
Technique of early operation for cleft palate, 279
Thompson, James E., 279
Tumors, myomatous, 28
of masseter, with special reference to sarcoma, 390
Typhoid perforations, operations for, 137

URETERECTOMY, 14
Urine, incontinence of, 200
Uterus bicornis, one hundred and twelve cases of, pregnancy in, 365
ossification of, 92
retrodislocation of, 313
retrodisplacement of, 180
suspension, by intramural shortening of round ligaments, 212

VESICAL calculi in children, 322

WALKER, EDWIN, 270
Watkins, I. L., 180, 188
Wilson, John T., 149, 179

This Book is due on the last date stamped below. **No further preliminary notice will be sent.** Requests for renewals must be made on or before the date of expiration.

DUE	RETURNED
AUG 11 1941	AUG 12 1941

A fine of twenty-five cents will be charged for each week or fraction of a week the book is retained without the Library's authorization.